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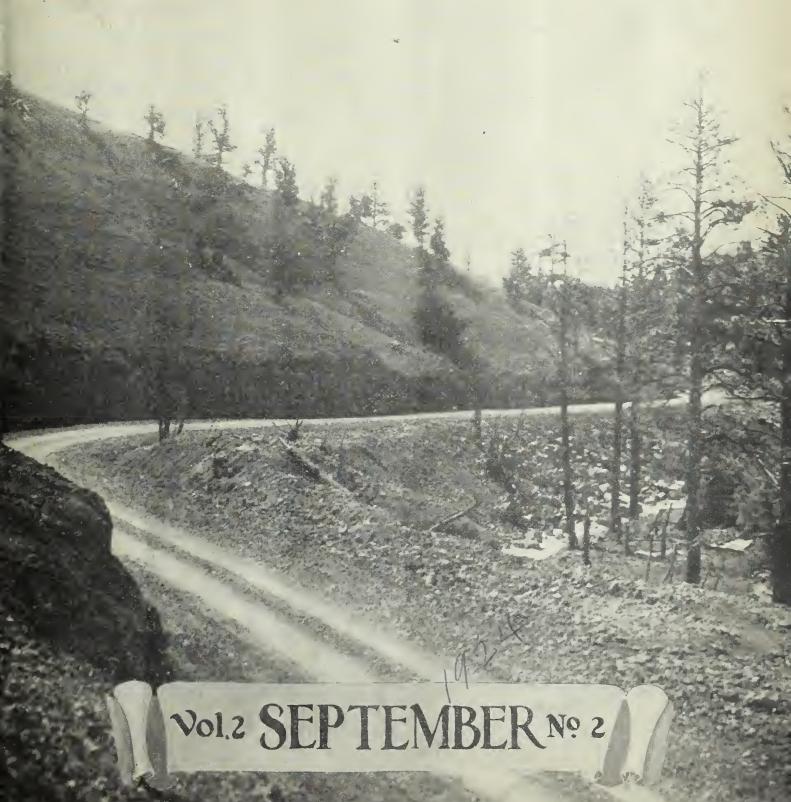
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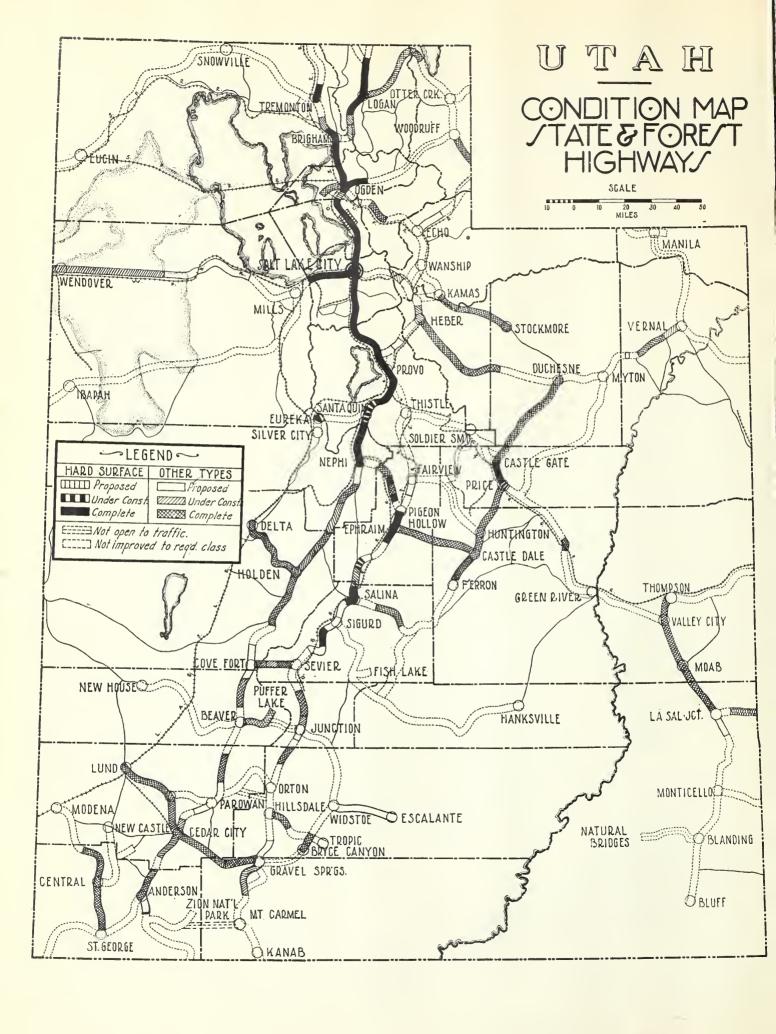
PORTLAND CEMENT ASSOCIATION

No. 321 McCornick Building, Salt Lake City, Utah A National Organization to Improve and Extend the Uses of Concrete

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Volume 2

SEPTEMBER, 1924

Number 2

State Maintenance of State Roads Made Possible With Gasoline Tax

Fees collected by the motor vehicle department from gasoline taxes amount to \$362,250.00 and from motor vehicle registrations \$442,920.00, up to June 30 of this year. Interest and sinking fund requirements for state road fund issues for the current year amount to \$675,-000.00, the administrative expenses of the motor vehicle department will be approximately \$50,000.00 or a total of \$725,000.00 to be deducted from the revenue derived from the gasoline tax and motor license laws before any funds are available for use on the roads. With these fixed expenditures allowed for we have a surplus of \$80,000 on July 1. From July to November the receipts will be added to the amount to be turned over to the state road commission for use in the maintenance of roads for the 1925 season and with a conservative estimate based on the returns for the previous months of the year will amount to at least \$330,000. The total of this year's maintenance budget is \$296,650, of which the counties pay 50 per cent, consequently it appears that the road commission will have no difficulty, next year, in taking over for maintenance the entire mileage of the state road system.

Receipts for seven months from the gasoline tax are as follows:

December\$	47,138.15
January	51,878.43
February	30,169.41
March	51,730.77
April	47,626.58
May	63,354.85
June	70,352.23

Total\$362,250.42

The returns for any one year will begin with December since the tax in any one month is not due until the fifteenth of the month following and not delinquen until the first day of the next succeeding month. For this reason we are unable at the date of writing to report an accurate figure for July.

Fees Collected from Registration of Motor Vehicles

Not all the surplus will be derived from the gas tax. Registration of automobiles and trucks to June 30, totaled 67,133, a number greater than the registration for the entire year of 1923. The demand for license plates during the last six months of the year will be light ,15,000 being estimated as the maximum, and most of these will be transfers for which a fee of only one dollar per transfer is collected. However the additional revenue from this source will probably exceed \$40,000.00.

The following tabulation gives the number of vehicles registered and fee collected during the past three years:

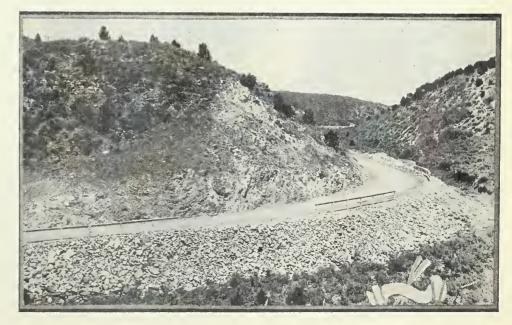
	No. of	Fees
	Licenses	Collected
1921	47,495	\$440,436.38
1922	48,869	747,902.50
1923	66,025	483,824.96

The variation in receipts for 1922 is due to the modification of the law in 1921, designed to increase the revenue from this source to a point where it would provide the required sinking fund and interest on road bonds. The reduction in 1923 is consequent upon a renactment lowering the fees again to a point where they are among the lowest

charged in any state. With this change occurred the enactment of the gasoline excise tax of two and one-half cents per gallon. It was the expectation of the formers of this law that the gasoline tax would provide funds sufficient to make up the deficit due to the lowering of license fees and in addition provide a surplus for road maintenance and the results give every promise of meeting with expectations.

Fixed Charges to Be Greater in 1925

Beginning with 1925, there will be added to the sinking fund \$62,500.00, which amount represents the annual requirement for the redemption of the \$1,000,000.00 issue of road bonds in 1921. To offset this additional charge on the road revenue we count on the increase in the number of motor vehicles in 1925 to provide sufficient revenue from registration fees and increased fuel consumption to at least make up the difference. Ten per cent has been estimated as the minimum rate of increase for next year over the number of vehicles licensed in 1924; with a total revenue in sight this



State highway through Wildcat Canyon, Beaver county



Logan Canyon—Logan-Garden City highway

year of \$1,095,170.00 an increase of six per cent should provide funds sufficient to take care of the increased fixed charges.

It is not likely that any funds for road construction could be set up from this revenue in any year over and above the amount required for maintenance even if the wording of the statute were changed to permit the use of these funds in construction. The state roads need to be maintained, in general, much better than they are. Maintenance patrols will be put on as rapidly as possible to extend the system of prompt and effective road repair that always meets with high favor wherever it is introduced. Maintenance by the patrol system costs the state money and is well worth it. A general fund for construction, and one that will be under the control of the road commission is, however, a necessity; one with which the state can match federal funds for the building of better highways entering the state and for improving state roads not on the federal aid system of highways. Under the present system of federal and county finances the state is necessarily seriously handicapped in the logical development of a state system of highways, one which as its name indicates should connect all parts of the state with good roads and also afford well built highways at our borders connecting with the main roads of adjoining states.

A state road then we conceive to be intended not primarily for any county, locality or section, but, wherever it may be, as an integral part of a system designed to serve the entire state.

In making up its budget this year for the distribution of the gasoline tax among the several counties the method considered by the commission as fair and equitable was one which took as a basis the mileage to be maintained and the volume of traffic thereon.

The following table shows the amount of gas tax funds that may be spent in each county this year assuming that an equal sum is made available by the county from its state road tax. The miles of state road included in the budget and the population as shown by the census of 1920, are given by counties:

, ,		- 5 - C CILITOR CD .	
F	opu-		Gas Tax
County 1	ation	Mileage	Funds
	5,139	95.4	\$ 4,473
Box Elder . 1	8,788	207.3	5,645
Cache 2	6,992	78.0	5,865
Carbon 1	5,489	104.6	5,350
Daggett	400	22.0	550
Davis 1	1,450	33.3	2,990
Duchesne	9,093	140.3	6,505
Emery	7,411	109.6	5,838
Garfield	4,768	136.0	3,955
Grand	1,808	119.3	7,095
Iron -	5,787	181.7	9,075
Juab	,871	67.3	5,003
Kane	2,054	63.6	2,230
Millard	9,659	97.4	7,960
Morgan 2	2,542	23.9	1,585
Piute 2	2,270	50.7	2,475
Rich 1	.890	76.0	3,753
Salt Lake159	,282	60.5	6,050
San Juan 3	3,379	132.1	4,103
Sanpete 17	,505	120.3	5,873
Sevier 11	,281	148.9	7,978
Summit 7	,862	148.9	6,450
Tooele 7	,965	201.2	3,513
Uintah 8	,470	63.6	3,515
Utah 40	,792	146.6	10,538
Wasatch 4	,625	86.6	5,870
Washington 6	,764	165.9	7,968
Wayne 2	,097	92.0	1,850
	,463	52.1	4,270
70			
Total449	,396	2,921.5	\$148,325

The following is an example of the simplicities of "pidgin" English, as set forth in a bill rendered by a Jap taxi driver in Hilo, Hawaii:

"10 comes and 10 goes at 50c a went. \$5."—Washington Star.

Pavement Reinforcement to Be Investigated

Announcement is made by Chas. Upham, director of the advisory boa on highway research of the national research council, that C. A. Hogentogl of the U. S. bureau of public roads heen granted leave of absence in ord to conduct for that board a fact-findin survey of the economic value of reiforcement in concrete pavements. The survey is to be national in scope, are will be conducted in cooperation with agencies interested in this important subject. It is proposed to cover the various soils, traffic and climatic conditions throughout the United States.

Mr. Hogentogler has had fifteen year of experience in highway construction and highway research which well qualifies him to take charge of the present investigation. After graduation from the Pennsylvania State college, and short period with the Pennsylvania State company, he was with the Pennsylvania State highway department, followed be several years on street and road construction with the Borough of Columbia Pennsylvania. For two years he was assistant professor of civil engineering at the University of Idaho. He was the engaged in research with the U. S. bureau of standards, and finally with the U. S. bureau of public roads in whice organization he has been for the passix years.

During this period, Mr. Hogentogle has been actively engaged in a number of important highway researches. These include the first impact and wear test at Arlington Farms and the tests to determine the cushioning properties of tires now being conducted by the U. Sureau of public roads in cooperation with the rubber association of Americand the Society of Automotive Engineers. In 1923 Mr. Hogentogler, as representative of the bureau of public roads conducted the study made in cooperation with the advisory board on highway research which resulted in the publication by the national research council of its bulletin No. 35, entitled "Apparatus Used in Highway Research Projects in the United States."

Mr. Hogentogler is the author of a number of important research papers which have appeared in "Public Roads' and were reprinted in various technical periodicals. He is a member of the American Concrete Institute and an associate member of the American Society of Civil Engineers.

Tooele-Bingham Road

The commissioners of Salt Lake and Tooele counties, following the recent disastrous fire in Bingham, have inspected the route of the projected Middle Canyon Scenic highway, the completion of which will connect the towns of Bingham and Tooele. With the construction of four miles of road over the mountain it was found that a highway could be opened up which would enable the Tooele fire department to respond to a fire call from Bingham Canyon in thirty minutes.

Natural Bridges in Southern Utah

(From American Motorist)

Three natural rock bridges of great size and beauty, occurring within a few miles of one another, near the head of White Canyon, are included in this monument located in San Juan county, Utah.

The natural bridges lie about 55 miles west of the town of Blanding, Utah, and are reached from that point by trail. Blanding, Utah, is reached by automobile road from Albuquerque, N. M., via Gallup and Mesa Verde national park to Cortez. There is a short cut from Cortez to Monticello, thence south to Blanding. From northern Colorado points entrance can be had through Grand Junction, Colo., to Thompson, thence south to Blanding. There is automobile stage service from Thompson to Blanding, a distance of 130 miles. Thompson is also on the automobile route from Salt Lake

Cn reaching Blanding, which is as far as the automobile can be used, it will be necessary to make the remaining fifty-five miles with horses and pack outfits Zeke Johnson, of Blanding, custodian of the monument, is an excellent outfitter and guide. The trail extends east across a series of canyons, and then climbs Elk mountain and passes through the Bear Ears, altitude 9,040 feet above sea level. Elk mountain is heavily timbered with giant western yellow pine and makes an ideal camping country. The trail descends the west face of Elk mountain to the head of White canyon, where the bridges are located. White canyon enters the Colorado river about 38 miles west at Dandy Crossing. On the opposite

bank is the town of Hite, which has one lone resident. From Hite it is 50 miles by trail to the nearest settlement, Hanksville, Utah, from which point a road may be traversed by automobile to the main road system of western Utah. The entire trail trip across is one of unusual beauty and interest, the country being rich in coloration and forms.

Edwin Bridge the Oldest

The Owanchomo (Rock Mound Bridge) from the conical rock mound upon it—locally called Edwin Bridge—is probably the oldest for it has been carved and chiseled until its span is comparatively a narrow strip of rock. Viewed at a distance one is surprised that it supports its own weight. It is the smallest of the three bridges and yet it has a span of 194 feet, being 35 feet wide on top but only 10 feet thick in the center. It rises 108 feet above the stream bed of a short unnamed canyon at its confluence with Armstrong canyon.

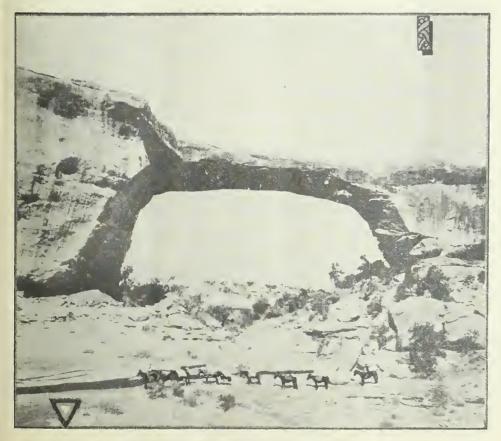
Three miles down Armstrong canyon at its junction with White canyon the Kachina, or, as it is better known, Caroline bridge is reached. A symbol carved on this bridge recognized as that of the Kachina, the sacred dancers of the Hooi Indians, gives it its name. This is the most massive of the bridges; rough hewn. it gives an impression of great weight and strength. The huge fragments of rocks and piles of sand and gravel in the canyon in the immediate vicinity are in harmony with the bridge as if the master workman, not yet having finished his work, had not thought it nec-

essary to clear away the debris. This bridge has a span of 186 feet, a width of 49 feet, and a thickness of 107 feet at its smallest part. It rises to a height of 205 feet above the stream bed.

About two and a half miles above the Kacnina, in White canyon, is the Sipapu, the Portal of Life. All Pueblo Indians believe they come into this world from a lower world through a hole or opening, called by the Hopi, "Sipapu." After death, they return through the opening to the lower world, where they remain a period before going to the sky to become "Rain-gods." The Sipapu, or as it is also known, Augusta Bridge, is the largest. It has a span of 261 feet, is 128 feet wide, and 65 feet thick at its smallest part, and rises to a height of 222 feet above the stream bed. It has been so carved and smoothed and is so beautifully proportioned that it is difficult to realize its great size. Nature has carried out the general scheme by providing a more beautiful setting than in the case of the other two bridges.

There are numerous ruins of cliff dwellers in the vicinity of the bridges perched in the canyon walls in almost inaccessible places. The monument also includes two large caves which are separated some little distance from the bridge region. The larger, Cigarat Cave, is in the face of a cliff under the rimrock of a canyon wall. It is about 150 feet wide, 20 feet high, and gracefully decreases to a terminus about 50 feet from the entrance forming a sort of half dome. There is a spring in the further recess of the cave which forms a stream that winds its way around the edge of the cave and sinks into the sand at its mouth. The vista looking into the canyon from the depths of the cave is a magnificent one.

The natural bridges are the result of eccentric stream erosion. Professor Byron Cummings, of the University of Arizona, who has spent a great deal of time in studying the bridges and the country in which they are found, gives the following explanation of their occurrence: "Ages ago the great sandstone beds overlying this entire region must have been pushed upwards by the internal forces of the earth, until, in the places of their greatest elevation, the various strata separated, mountains were formed, and large cracks opened up that extended in zigzag lines away through the slopes of this vast tableland. This process of elevation was undoubtedly a gradual one; and, as the waters of the mountains sought a lower level, they took their courses through these irregular crevices, searching for the ocean which was then not far away. Their rushing currents and surging eddies wore off the sharp corners, sough out the soft places in the vielding sandstone, dug out deep caverns and recesses in the cliffs, and left behind them a series of graceful curves and fantastic forms that amaze and delight the traveler at every turn. As the formation was pushed upward from time to time, these rushing torrents and surg-



Edwin Natural Bridge-San Juan county

(Continued on Page 8)

Splendid Progress is Being Made on Wendover Road

Although at first glance it may appear a few months out of season the first of the accompanying photographs has nothing to do with ice harvesting but was taken, on the contrary, on a hot summer day on the desert. The location is on the salt beds, Station 550, east from Wendover on the Nevada state line and shows the method of obtaining embankment material on the "salt section" of the Wendover cutoff. The total length of this project, which crosses the Great Salt Lake desert in Tooele county, is 41.4 miles. Most of this mileage is across saline mud flats, the exceptions being short stretches at both extremities and six miles across the salt beds which begin about six miles out from Wendover. The salt layer averages about three feet in thickness. A series of parallel trenches have been cut through the salt on this six mile section and the underlying clay excavated with a trencher which elevates and conveys the material to the road bed.

Since these pictures were taken the work of placing and finishing the embankment on this portion of the road has been completed and nearly all the gravel surfacing has been placed. This also applies to the road between Wendover and the salt beds. For the first

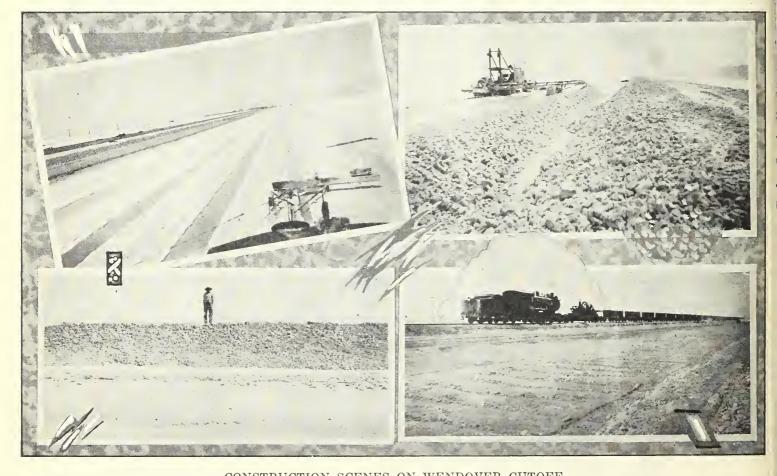
four miles from Wendover the gravel for surfacing was obtained from the Wendover pit and required a wagon haul; for the remainder of the project the gravel is brought from the Dyke pit in Nevada, over the tracks of the Western Pacific railroad and unloaded as required along the railroad grade which parallels the highway across the forty miles of desert, about 100 feet to the south. Both trenchers and drag lines are being used to throw up the grade across the mud flats. Fifteen miles on the east end are graded and gravel surfaced. On the remainder of the salt beds, the grading is well advanced on seven miles, for six miles east of Arinosa little has been done aside from the placing of drainage structures.

The contractors on this big project are Kroft, Bundy & Lamus, an Ogden firm, the grading on the salt section is under a separate contract to N. E. Lamus. Lee Wendleboe is the state's resident engineer on the work. Excellent progress has been made to date on this work, this being the one road project in the state on which the dry weather of spring and summer has accelerated progress. The salt section was heavily flooded during several months following the award of

contract last September, the trenching operations and placing of the embankment continuing nevertheless all winter. A forty mile project means the moving of an enormous amount of material in the formation of a continuous embankment. Altogether 400,000 cubic yards of clay are required to form the completed roadway which in no place has a height of less than two feet; the road is 24 feet wide across the top. Surfacing of the road, together with bank protection on the north side across the salt section requires 80,000 cubic yards of gravel. Maintenance requirements both in the 18-foot gravel surfacing strip and for beaching will be met by the placing of several thousand cubic yards of gravel at convenient intervals along widened portions of the embankment.

There is every indication that the road will be finished before winter, at any rate it will be open in ample time for the tourist season next spring.

With its completion the state of Utah will have attained a long desired goal, that of bridging the western desert with a serviceable modern highway and the biggest and most necessary improvement in the building of the Salt Lake-San Francisco highway will be an accomplished fact.



CONSTRUCTION SCENES ON WENDOVER CUTOFF

1—Station 550 looking west from top of digger, showing 12-ft. salt trenches and clay removed for roadbed; 2—Station 700 looking east, digger is making second cut; 3—Shows height of grade on salt beds; 4—Unloading gravel train.

Bonds As A Gauge of Contractors Responsibility

Within the last few years, an association has been formed, called the Associated General Contractors of America, which is rapidly grouping together the real constructors of this country. Their motto is Skill, Integrity and Responsibility.

This association has had sufficient dealings with the national associations of engineers, architects, state highway officials and others engaged in the construction industry to indicate that it is recognized as a representative body for the constructors. It is our desire to see that the members fully comply with the spirit of the motto, Skill, Integrity and Responsibility, and why? Because it should go without saying that the real assets of any constructor are, and necessarily must be, skill, integrity and responsibility.

We fail to find any experienced engineers, or fair owners, who want any other type to handle their construction work. The three words should require no explanation or definition, but I want to submit to you now, that in the construction business, necessarily skill must include not only the knowledge of how to work, but of having full knowledge of what constitutes costs of that work.

Particularly since the advent of the large road building programs in this country, we have had a large increase in public lettings. This means that instead of having the private owner who can select a few contractors whom he deems desirable, practically any one can submit a figure on public work. In connection with this, permit me to call your attention to one peculiar fact, and that is that the novice or man who has not previously built a certain type of construc-tion always thinks that it can be built for less money than is really the fact. He rarely errs in being too conservative.

Following up the above reasoning, we find that the private owner has always had a means of selecting the type of contractor he desires. In the past, the largest work in the heyday of railroad construction was handled by employees who could select.

The highway engineer, the city engineer, or any other public servant, has not that privilege. In most cases, he is tied down by law to let his work to the lowest responsible bidder and this means any one able to secure a bond. Happily in some places, because of the bad results from this type of letting, special legislation has been passed enabling the engineer to require a questionnaire as to finances, experience, equipment and past performance, and to use this information in making decisions of award. However, in many instances, even when the engineer has this choice, he will be subjected to political log-rolling because he has hanging over him the prevailing idea that the responsible bidder is the one who puts in the lowest price and can provide a bond.

But is this true? When the state, the county or municipality, as may be, wants to let a piece of work, it is usually a case where the need of that work has been established as a paramount issue. It must be properly built and it must be produced at the earliest possible moment, as in most every case it has already been established that unless the need is supplied, the state, county, or municipality, and every citizen, is suffering indirect loss through lack of it. For instance, a hard surfaced road is projected in a certain locality. Why? Because it is badly needed and the traffic is too great for any other class of road. Every day that this work is not produced, every interested tax payer has certainly experienced a loss in operating his car over detours, etc. You can apply the same reasoning to every type of contract, bar none.

If this is so, then who is the lowest responsible bidder? He must be the man who has the necessary reserve back of him to finance the work properly, who has the necessary organization to handle that equipment and to do the work, and who has the known ability to properly supervise and push that work to its ulti-mate conclusion with the desired time limit. Now then—when a bonding company essays to underwrite the lowest responsible bidder on a piece of work, they are taking on a serious responsibility to the state, county, municipality, the tax payer and public at large. In the last analysis they are the ones to say who is a responsible bidder or who is not. They certainly should be, and really are, accounting for their stewardship to the nation.

As the matter stands today, the attitude of the bonding companies in con-nection with that little phrase, the "low-est responsible bidder," is the rock on which the construction business of the United States is being dashed to pieces.

Some fourteen years ago, when I entered the contracting field, and I assure you it was on a very small scale, I found that the bonding company which was willing to handle my case, felt it necessary to inquire carefully into what work I had done before, and in a general way as to my ability as a construction man and as to whether or not I had knowledge of costs sufficient to justify my These were apparently as much or really of more value, than the funds I had available. If that were the situation today, I do not believe we would be trying to make a case against the bonding companies. But what do we find? We find that because of poor risks taken by the bonding companies, the premium has been increased over 1,000 per cent so that it is now 1½% of the total cost of the work. We learn that field agents are being paid an unreasonable percentage amounting to as high as 25% of the total premium in order to secure busi-This method blinds them to any idea of safeguarding their employer, the

bonding company, and in many cases we are certain that the bonding company accepts the risk on what looks to be a fair statement of facts, but which are not such, in reality. It has become so not such, in reality. It has become so bad that at a recent letting, a gentleman connected with one of the large engineering papers in this country happened to be in a hotel in a city where a letting of a large construction project was taking place was approacheed by a bonding salesman, and the following dialogue took place:

Question: "Are you bidding on this

work?"

Answer: "Well, I have not really decided as yet."

Bonding Salesman: "Well, if you are, I have it all fixed up to take care of your bond."

This way of getting business can have only one outcome; namely, that a bonding company trapped through lack of foresight on the part of its staff or its agent, is prone to take unfair advantages of technicalities, and in very many cases it has therefore been necessary for the owners to bring suit against the bonding company to force it to comply with what it had already agreed to do, namely underwrite the work. And bear in mind, gentlemen, that any fair underwriting of that work does not merely mean to complete it, but to complete it on time. I ask you, gentlemen, how many cases have you heard of when work has stopped through default and it has been necessary to make arrangements with a bonding company where the work has been finished on time? Indiscriminate low bidding by inexperienced people, underwritten by careless bonding companies has caused a very serious situation in the construction field. Old construction companies of established reputation are dropping out of the field of public construction. Engineers in charge of such work are being forced to the conclusion that such bonding has no real

They, and the contractors in general, are seeking an outlet which will give the experienced contractor an opportunity to get the work. They can clearly see the loss which constantly occurs from the policy of getting a low bidder that doesn't come through.

I invite you to read the editorial in the Engineering News Record of January 10th in which Mr. Towner of the Towner Rating Bureau gives the reasons for the increased premium rate on bonds and I particularly direct your attention to the reply from Mr. Henry H. Wilson, of Harrisburg, Pennsylvania, chairman of the highway committee of the Associated General Contractors of American. His reply is worthy of your careful consid-

At a joint meeting of the committee on cooperation with contractors of the American Assocaition of State Highway Officials and a committee of the Associ-

(Continued on Page 7)



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STATE ROAD COMMISSION

Preston G. Peterson	
Henry H. Blood	Member
Henry W. Lunt	
Agnes McNeil	
_	
Howard C. Means.	Chief Engineer

DEPARTMENTAL OFFICERS

H, S, Kerr	Assistant Chief Engineer
E. C. Knowlton	
Levi Muir	
Gam Hayward	Office Engineer
F. S. Thompson	Chief Draftsman
Maurice Housecroft	Chief Bridge Draftsman
W. C. Nuttall	Senior Accountant

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H, V. RICHARDS, Editor

CEDAR-LONG VALLEY ROAD

(See Cover Picture)

The front cover on this month's issue shows a part of the Kane county side of the Cedar-Long Valley national forest highway recently completed by the Higbee Construction company. On the west, or Iron county side, twenty-five miles of road constructed several years ago by the forest service is now being improved by widening at various points and the application of gravel surfacing over numerous stretches. The road, which is now open to traffic throughout, leaves the Zion Park highway at Cedar City, the western entrance to the Sevier section of the Dixie forest, and the colored cliffs in the eroded section known as Cedar Breaks, the chief scenic asset of the forest and one of the show places of the state. Extending entirely across the Sevier plateau to a connection at Gravel



General view of Zion Canyon-Zion National Park

Springs with the Bryce-Grand Canyon highway the road traverses high ground, well timbered with western yellow pine, and passes near the highest point, the beautiful Navajo lake. The total length of the road is forty-five miles; Navajo lake is about twenty-five miles from Cedar City and near the three mile spur to Cedar Breaks.

Considered as a part of the state road system the new road besides forming a convenient connection between the two main north and south highways marks a long step toward the completion of the proposed scenic highway loop which will enable the visitor to southern Utah to visit the points of scenic interest in the region without any long retracements.

GENERAL PROGRESS OF CONSTRUCTION

Since the first of the year a total of fourteen contracts for the construction of roads and bridges have been completed. All of these were "carry-over" jobs, that is, were under contract in 1923. The completed projects include 86.5 miles of gravel surface road and 12.2 miles of concrete pavement. In effecting their completion 34.5 miles of gravel road and 5.9 miles of pavement were built in 1924. The value of these completed projects, including several bridges built, is \$1,408,665.

On some of these projects actual construction began and the entire mileage was completed this year, others getting away to a late start last year moved rapidly to completion during the present season. Not all of the projects have been built with such a commendable rate of progress. In fact, this has been a grand "CLEAN UP" year in the way of putting on the list of finished jobs a number of projects "inherited" by the present commission, which, due to the failure of the contractor or want of funds on the part of the county, have dragged, in some instances, from as long ago as 1919. Projects may still be occasionally slowed down due to the financial collapse of the contractor, but so far as a shut-down, due to lack of funds, is concerned it can hardly happen again due to the fact that the local funds required to match federal aid, from whatever source derived, are now always fully paid into the state treasury before the state road commission will execute a contract for construction.

It is gratifying to note that of the twenty-one projects under construction at the close of August, none were begun prior to 1923, and that the majority of these are this year's undertakings. The total mileage represented by these projects is 134.62 gravel surface and 12.29 concrete pavement. Their value with miscellaneous structures now being built as a part of these projects or as separate contracts, including the River-dale viaduct, is \$1,940,860. A considerable mileage has already been completed and opened to traffic on the roads under construction; wherever practicable detours are eliminated or shortened as rapidly as possible and traffic routed over such sections of the new road as may be ready.

The above figures do not include any forest highway mileage. From July 1, 1923, to June 30, 1924, a total of 109.7 miles of forest development roads were completed at a total cost of \$81,374.00. During the same period 393.5 miles of trails were completed at a cost of \$26,975.00.

SARDINE CANYON ROAD COMPLETED

The new canyon road from Mantua to Wellsville was officially approved and opened to traffic September 5 after inspection by bureau, state and county road officials. The general public will rejoice upon hearing that this road has been completed, especially since it will furnish an all year route into Cache valley.

The new road is approximately eleven miles in length and was completed at a cost of about \$200,000.00. The maximum grade is six per cent and the minimum curve radius 175 feet. The roadbed has an average width of 24 feet with surfacing 18 feet in width, making it possible for cars to pass with ease and to cross this summit in high gear. Those who have not had the pleasure of riding over this new highway will be greatly surprised and we hope pleased.

The Sardine Canyon section was constructed by Olaf Nelson of Logan, and was the most difficult piece of construction that has been completed in recent years. Mr. Nelson is to be commended for this splendid piece of work.

The Wheelwright Construction company of Ogden had the contract for the Mantua-Wellsville section and this company, too, deserve credit for their work and excellent progress. The entire construction was under the supervision of K. C. Wright, resident engineer for the state. Mr. Wright is also the original locator of this route and to him goes the credit for this well designed highway.

Bonds As Gauge of Contractor's Responsibility

(Continued from Page 5)

ated General Contractors of America, neld in New Orleans, December 4th, cortain matters pertaining to highway costs and contracting practices were deliberated and conclusions pertaining thereto were reached as herewith outlined:

"The expansion of hard surfaced highways has been attended by such an influx of new construction companies into this field that many contractors have secured contracts which they are incapable of performing. Much unnecessary engineering expense, friction, improper conduct of construction, expense to tax payers in being deprived of the use of coads and other unfavorable contingenties are resulting from the bonding of presponsible contracts.

"By reason of their ability to obtain a corporate bond (and the practical credit which goes with a guarantee of labor and material costs) many concerns inadequately experienced have been able to secure and embark upon the execution of large projects and have subsequently defaulted.

"Engineers would not willingly award a contract to a construction company known to be incapable or unwilling to execute the work satisfactorily, yet situations frequently arise where departments cannot publicly justify themselves in refusing to accept the proposal of an unqualified company. This condition appears to result from the ease with which almost any concern professing to be a construction company can obtain a performance bond.

"To the layman unfamiliar with the difficulties involved where a highway department is attempting to carry out a definite mileage on schedule, a financially strong surety is regarded as ample safeguard to the state. In view, however, of the delay and legal procedure frequently incurred by default, a corporate bond has often proved an inadequate and expensive form of protection. Some means is needed for minimizing the operating of irresponsible contractors on highways and for encouraging the growth of more responsible concerns.

"Most highway departments now have the authority to reject the bid of an irresponsible company, but in practical effect such authority can seldom be freely exercised. As long as irresponsible bidders can secure a bond and the public is willing to accept that bond as a guarantee of responsibility, the highway official will not be in a position to exercise his rightful authority. In other words, he cannot judiciously refuse in many instances to award a contract to the incapable contractor while this practice of promiscuous bonding continues.

"The present situation is one which appears to have passed in a great measure beyond the control of bonding officials and to have resulted primarily from the commission system of compensating underwriting agents and the freedom exercised by these agents in writing bonds.

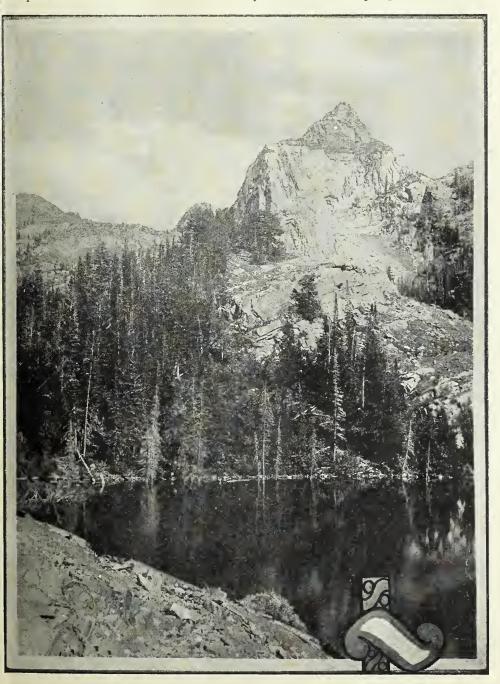
"Agents are reported as receiving commissions amounting to as much as 25 per cent to 35 per cent of the total premium. Local competition between agents of different companies is apparently keen. Their primary interest is often manifested chiefly in securing a bond for the lowest bidder, not because he is competent, but merely in order to secure the compensation involved. This tendency has naturally resulted in heavy premium rates. Within the last 20 years the cost of premium has risen in some instances, more than one thousand per cent. The practice has apparently been to bond almost any low bidder and to let the increasing premiums cover the losses from default. The public has paid the bill.

"This situation could not occur in a truly competitive industry where the demand for a commodity is influenced by the prices charged. In the public bonding field, because of urgent demand, where work will proceed almost independently for a bond premium rate and because of a standard rate, it has been possible to increase the rate to a point where such increases mean millions of dollars annually to the public but which have not increased the net earnings of the bonding companies in proportion.

"If the mere payment of a high premium were the only element involved the matter might be of less concern to engineers and public officials, but a more vi'al factor is involved by the disruption of highway programs, delays in building and expense resulting from defaults.

"State highway officials can exercise an effective remedy by encouraging a measure of competition in the surety field. Such competition would tend to reduce bond premium rates, this necessitating more judicious bonding of contractors, which is the main objective to be sought.

"If the surety companies cannot devise a means of eliminating detrimental



Lake Blanche-Wasatch National forest

practices on the part of agents, and of faithfully performing their stewardship to the state, the force of public opinion will eventually demand that their house be placed in order. Therefore it is proposed that before present conditions become more aggravated, representative bonding officials be invited to meet with representatives of The American Association of State Highway Officials and Associated General Contractors to devise, if possible, an amicable and cooperative method of relieving the present situation."

As a means of enabling highway officials to ascertain responsibility of bidders with respect to a given project, various states have devised questionnaires designed to reveal the bidder's qualifications. These forms vary considerably in detail, require, in general, a statement of financial resources, equipment available, experience and personal references from bankers and public officials. From these the highway official is able to gauge more accurately the bidder's ability to perform a given project.

The sad part of it all is that the remedy is so simple. The business can be secured as easily as a good risk, as it can be as a bad risk. When the bonding companies learn that it is to their interest to see that the so-called lowest responsible bidder has the skill, integrity and responsibility, bearing in mind that the skill necessarily means having a knowledge of costs obtained from first-hand experience, then the contractors will be protected, and the engineer will be protected and the public will be protected.—Georgia Highways.

Natural Bridges in Southern Utah

(Continued from Page 3)

ing estuaries kept on with their work of cutting, smoothing, and filling until they have produced the deep box canyons so prevalent in this section, which sometimes widen out into small valleys of rich alluvial devosit and again narrow down to mere slits between huge masses of cliffs.

"This elevation and opening of the formation often left a narrow section of the cliff extending out into the gorge for rods, around which the stream had to make its way as it rushed onward in its course. The constant surging of the waters against this barrier revealed a soft place in the sandstone, where it gradually ate out a half-dome shaped cave. In a few instances as the waters swirled around the other side of this barrier, they reached the corresponding soft place on the opposite side and ground out a similar half-dome there. When, in the course of time, the backs of these two semi-circular caves came together, the waters found a shorter course through that opening. enlarged the archway, and smoothed off and rounded into graceful curves the sides of its massive buttresses. Thus a bridge was formed and became a mighty span of enduring rock, whose foundations and graceful superstructure were laid by the ages.'

GOOD ROAD ECONOMY

TIMES were when road travel was slow and interstate travel of small consequence.

NOW road travel has become an important business consideration. Realization of this importance emphasizes the economy of building and maintaining Modern Good Roads.

Morrison-Merrill & Co.

"The Lumbermen"

SALT LAKE CITY



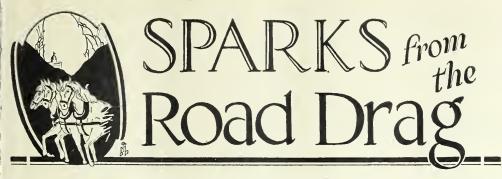
UTAH

Use of Road Oil on State Highways Proves Successful

The state road commission, through the maintenance department and under the direction of E. S. Borgquist, assistant engineer, has during the past two months oiled approximately seventeen miles of shale and gravel surface roads. This work has proved very successful and many favorable comments have been received. The use of oil on these roads was at first only contemplated as a dust preventative where the travel was very heavy and extensive sprinkling was necessary in previous years. It has been proved, however, that this oiling has not only eliminated expensive sprinkling

but has cut down the cost of maintenanc to a minimum. It was found that the of acted as a binder to the surfacing an prevented the ruts and chuck holes which were always present in previous year and required constant maintenance. It is believed that these experiments with offer a solution to some of the maintenance problems in this state.

The oil was applied by a standar pressure road oiler. About 1000 gallor per mile were used at a temperature of 200 degrees Fahrenheit and under pressure of 45 pounds.



Cause and Effect

The following news item appeared in a metropolitan newspaper recently: "Rastus Johnson accidentally drove his car into the parade of the Ancient Order of Hibernians. He would have been 39 years old next September."-T. A. G.

Horrors!

An Irishman coming out of ether in the ward after an operation exclaimed audibly:

"Thank God that's over "
"Don't be too sure," said the man in the next bed. "They left a sponge in me and had to cut me open again." the patient on the other side said: "Why, they had to open me, too, to find one of their instruments."

Just then the surgeon who had operated on the Irishman stuck his head in the door and yelled: "Has anybody seen my hat?"

Pat fainted.—Exchange.

A Pattern for Husbands

"Young women nowadays," remarked an ornithologist in the employ of the government, "take too light a view of marriage. While in the west last summer I was induced to lecture to a summer school. During the course of this lecture I chanced to remark:

"'The ostrich sees very little; on the other hand, it digests everything.'"

Wherever a girl on the front house.

Whereupon a girl on the front bench exclaimed, sotto voce, to her neighbor: 'Gee! What an ideal husband an ostrich must make!"-Harper's Magazine.

Road Signs-By "Bugs" Baer

"Don't run up your mileage with skids."
"Don't do your thinking with your brakes."

"There are three grades of eggs, but only one grade of crossing, and that's dangerous.

"The glass in your windshield is the same stuff they put in hospital windows, which you will look through."

"Fifteen miles an hour may be a chill, but fifty is a fever."

"Speed limit in this town, fifteen miles an hour. One day for every mile over that or we have seventeen hotels and one jail, take your pick.

"Don't try to scare locomotives with your horn."

"One minute you save may be your last one."

"You wouldn't travel on a freight

train, so don't try to travel under one. "Accident insurance is a good thing to have without the accident."

-Courtesy N. H. Assn.

Quite Another Matter

Irate Papa: "No, sir. My daughter

can never be yours."

Bright Suitor: "Quite right, sir. She cannot possibly be my daughter. I only wanted her to be my wife."—Colorado

"Willie," asked the teacher, "what was it Sir Walter Raleigh said when he placed his cloak on the muddy road for the beautiful queen to walk over?

Willie, the ultra-modern, gazed about the classroom in dismay, and then, taking a long chance, replied:
"Step on it, kid!"—Kablegram.

Oh You, Bertie!

Mrs. Youngbride (just back from honeymoon): "Poor Bertie was so embarrassed when he went to the hotel, what do you suppose he said to the clerk? I thought I'd die! He said, 'I'd like a room with a wife for myself and bath.'" —Selected.

Already Done

The blushing bride-elect was rehearsing the ceremony that was about to take

"I shall expect you to give me away, dad," she said to her fond parent.

The latter looked up nervously from his paper. "I'm afraid," he murmured, "I've done it already. I told Herbert this morning that you had a disposition like your mother's!"—Exchange.

And Here's Betting He Gets to Where He's Going With It

Main street yesterday parted in the middle, the chivalrous host to a stranger

It was an elderly stranger, of a wellknown family.

Fenderless it was, with its back mashed in, and one front wheel wobbled as it went on its way.

The doors had departed and the once shiny cushions now exposed their excel-

sior, But the pilot of this curious craft, wobbling whither no one knows, was voung.

And in his heart beat the spirit of a gentleman.

For, in loving script upon his vehicle's ancient flanks, the driver had lettered

"Don't laugh, folks—you may be old yourself someday!"

And Main street doffed its hat in reverence and appreciation as the ten-million-and-tenth apology went westward into history.-Salt Lake Tribune.

IDEAL SAND and GRAVEL

"IDEAL" SAND USED IN CONSTRUCTION OF THE HELPER-PRICE CONCRETE HIGHWAY HOOPER CONCRETE HIGHWAY MAGNA-TOOELE CONCRETE HIGHWAY HIGHLAND DRIVE HIGHWAY AND OTHERS

> ESPECIALLY ADAPTED FOR WORK WHERE A CLEAN WELL GRADED SAND IS ESSENTIAL

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UTAH GASOLINE AND OIL

Tests prove that Utah Made Gasoline has no superior. It surpasses government requirements of quality.

Buy at service stations where you can get Utah Made Gasoline and Oil. When you do, money is kept at home for the upbuilding of our own state. Moreover, you get the BEST!



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Ouch!

Demure Maiden (lately returned from college): "—and father, Terry has lots of money, a big car and a fine old southern family behind him."

Forceful Father: "Well, I hope he's

nice to boot.—Awgwan.

Status of Federal Aid Projects

By F. S. THOMPSON, Chief Draftsman

UNDER CONSTRUCTION AUGUST 31, 1924

No.	County	Name	Type	Lgth.	Per Ct. Comp.		Estimated Cost
10-B	Uintah	Ft. Duchesne-Vernal	Gravel	3.19	85	A. G. Young & Co.	
10-C	Uintah	Ft. Duchesne-Vernal	Gravel	(1.31)		A. G. Young & Co.	69,596.17
10-B	Uintah	Bridges for above	Wooden	4 Br.		Caldwell, Batty & Eaton	·
17-B	Juah	Chicken Creek, Millard Co.	Gravel	13.87	62	Hawley, Anderson & Hinkley	93,686.67
19-B	Piute	Junction-Red Bridge	Gravel	5.28	0	Clark Construction Co.	35,536.28
24-C	Carbon	Price City	Concrete	1.12	50	Utah Concrete & Stucco Co.	76,839.69
31-A	Weber	Riverdale Overhead	Gravel	0.05	80	Union Construction Co.	43,072.63
31-B	Weber	Bridge for above	Steel	144 ft.	95	J. J. Burke Co.	43,974.86
33	Cache	Sardine Canyon	Gravel	6.96	-	Olaf Nelson	114,448.37
42-A	Wasatch	Heber-Hailstone	Gravel	7.46	75	Gilkerson Const. Co.	68,904.85
42-B	Wasatch	Hailstone bridge	Steel	63 ft.	99	Christensen, Jacob & Gardner	21,682.61
43	Sevier	Richfield South	Concrete	1.50	90	Gray & Murdock	62,569.52
47-B	Sanpete	Moroni-Fountain Green	Gravel	7.09		Reynolds Ely Co.	53,298.19
47-D	Sanpete	Fountain Green-Juab Co.	Gravel	5.33		Reynolds Ely Co.	45,064.48
49	Summit	Gogorza-Salt Lake Co.	Gravel	3.06	55	Moss, Snarr & Thayne	40,448.27
50	Utah	Payson-Juab Co.	Concrete	8.56	60	Wasatch Grading Co.	261,464.68
51-A	Tooele	Knolls-Wendover (Salt Sec.)	Earth	6.06		N. E. Lamus	66,120.00
51-A	Tooele	Knolls-Wendover	Gravel	41.40	48	Kroft, Bundy, Zimmer & Lamus	280,000.00
52	Sevier	Salina-Redmond	Concrete	3.00		Gray & Murdock	96,288.13
53	Juab	Nephi City	Concrete	1.77	100	Wasatch Grading Co.	36,070.43
54	Iron	Cedar-Kanarra	Gravel	12.01	70	J. T. Raleigh Co.	110,427.19
55-A	Washington	Ash Creek-Iron Co.	Gravel	8.65	0	Paxton, Dorrity & Black	140,727.42
56	Sevier	Redmond-Sanpete Co.	Gravel	2.13		Reynolds-Ely Co.	14,267.91
57	Sanpete	Gunnison City	Concrete	1.11	50	Reynolds-Ely Co.	42,068.70
57	Sanpete	Gunnison-Sevier Co.	Gravel	10.31	50	Reynolds-Ely Co.	93,141.82
58	Box Elder	Cache-Mantua	Gravel	4.14	89	Wheelwright Construction Co.	84,078.83
60-A	Summit	Echo-Emory	Gravel	11.0	0	Wasatch Grading Co.	153,288.73
63-A	Box Elder	Chase-Bear River City	Gravel	5.09	0	Olaf Nelson	80,385.19
67	Millard	Scipio-Holden	Gravel	12.04	0	Hawley, Anderson & Hinckley	85,823.99
71	Uintah	Uintah River Bridge	Steel	120 ft.	0	C. F. Dinsmore & Co.	45,628.17

	Projects Advertised					
No.	County	Name	Type	Length		
5D 65A	Grand Utah	Court House-Seven Mile Wash Orem-Wasatch Co. Line	Bridges 1- Gravel	-200 1-100 ft 3.4 Mi.		
	Proje	cts for which Plans have been Sub	mitted			
55B 63B 63C 66A	Washington Box Elder Box Elder Iron	Ash Creek Bridge Bear River Bridge Malad River Bridge Parowan-Winn Hollow	Reinf. Con	Arch 200 Ft. crete 250 Ft. crete 100 Ft. 9.6 Mi.		
		Plans in Course of Preparation				
7A 61A 61B 61C 77A 68A 81A 82-A 94-A 98-A	San Juan Sevier Sevier Sevier Sevier Millard Washington Beaver Duchesne Beaver Millard	La Sal Junction-Wilson Wash Salina-Aurora Aurora-Sigurd Sigurd Richfield So. Richfield-Elsinore Cove Fort-Dog Valley Anderson Ranch LaVerkin Manderfield Hill Myton-Antelope Wild Cat-Millard Beaver Line-Cove Fort	Gravel	7.0 Mi. 4.2 Mi. 7.5 Mi. 6.5 Mi. 5.5 Mi. 3.0 Mi. 4.0 Mi. 0.5 Mi. 10.0 Mi. 6.0 Mi. 2.5 Mi.		
		Surveys Completed				
19D 51B 64A 68B 73A	Piute Tooele Piute Millard Utah	Red Bridge-Garfield County Timpie-Knolls Marysvale-Sevier Dog Valley-Kanosh Springville-Soldier Summit	Gravel Gravel Gravel Gravel Gravel	3.5 Mi. 35.0 Mi. 4.9 Mi. 14.0 Mi. 30.0 Mi.		
		Proposed New Work				
62-A	Davis	Devil's Gate-Weber	Gravel	9.0 Mi.		

Extensive Road Contracts Let in the Past Month

The month of August has been an important one in the history of the present state road commission for the reason that during this month more road projects have been advertised and let and more federal aid projects have been placed under construction than in any previous month since the inauguration of federal aid in this state.

August 19 bids were received on what is known as the Echo-Emory highway in Summit county, F. A. P. No. 60, Sec. "A." The Wasatch Grading company of Provo was awarded this contract with a figure of \$153,288.73 as the total for labor items. This figure does not include the cost of the Underpass section at Echo which will be built by the Union Pacific railroad at their expense. The contract on the above was awarded August 30 and actual construction begun.

August 19 the contract for building the Chase-Bear River City road in Box Elder county was awarded to Olaf Nelson of Logan, Utah, whose bid was \$67,400.00. Work has already started on this project and good progress is expected in the next two months.

Project and good progress is expected in the next two months.

Bids were opened in July on the Black Ridge project in Washington county, known as F. A. P. No. 55, Sec. "A." Because of the peculiar method of financing the county's portion of the costs the commission was not able to award the contract until August 30. This contract includes some of the heaviest grading work

(Continued on Page 12)

The Federal Aid Highway System

By T. M. MACDONALD, Chief of Bureau of Public Roads

The federal highway act approved November 9, 1921, provided for the selection by the state highway departments of a system of highways not to exceed seven per cent of the total highway mileage of each state. Upon this system, all apportionments of federal aid are to be expended. The system is to be divided into two classes, primary and sec-ondary, of which the former is not to exceed three-sevenths of the total, the remainder to be of the latter class. The secretary of agriculture was given authority to approve in whole or in part the systems as designated by the state highway departments or to require modifications or revisions thereof.

The total mileage of existing highways certified by the states was 2,866,061 miles. The states designated by maps and route description, systems of main roads totaling in mileage not more than seven per cent of the certified mileage. The systems for groups of adjoining states were reviewed by representatives of the states and of the bureau of public roads meeting in a series of conferences for the principal purpose of connecting the systems at state lines. In this way the entire system was coordinated and recommended to the secretary of agriculture by the bureau of public roads. The system as approved by the secretary of agriculture and represented by the map published on November 1, 1923, includes 168,881 miles which is 5.9 per cent of the certified mileage.

Up to March 1 the federal aid highways which had been completed since the passage of the federal aid road act in 1916 totaled 33,036 miles, and 13,800 miles were under construction and reported as fifty-nine per cent complete. The total of roads completed and under construction amounted therefore to 46,836 miles. Of the mileage reported as completed on February 29, 6307 miles had been completed during the current fiscal year. All but a very small percentage of this mileage is on the federal aid highway system as now established.

In addition to the roads of the system improved with federal aid parts of it have been improved without federal assistance. A careful study is being made of the improvement status of the system and an approximate estimate based upon these incomplete studies is that at the end of the year there were about 60,000 miles of surfaced roads and 8700 miles graded, which leaves nearly 110,000 miles yet to be surfaced.

To bring this system up to serviceable standards, therefore, within the full decade ahead, would mean a surfacing program of about 11,000 miles for each of the ten years—this in addition to the additions to the system, the separation of grade crossings. reconstruction, and much other work necessary.

The mileage completed has increased year by year, since the beginning of federal aid road construction, that of 1918 being but 12.5 miles while the mileage completed during the following years were: 1919, 177; 1920, 1493; 1921, 5787; 1922, 10,247; 1923, 8820, and the first

		Average	
Mil	es	Cost Per	Mile
No.	%	Amt.	%
6,677	20.2	\$ 7,658	9.0
3,507	10.6	7,247	4.5
13.019	39.4	9,842	22.6
885	2.7	18,248	2.9
1.546	4.7	30,083	8.2
939	2.8	33,872	5.6
5,909	17.9	38,842	40.4
505	1.5	44,242	3.9
49	0.2	,	2.9
	No. 6,677 3,507 13,019 885 1,546 939 5,909 505	6,677 20.2 3,507 10.6 13,019 39.4 885 2.7 1,546 4.7 939 2.8 5,909 17.9 505 1.5	Miles Cost Per Amt. 6,677 20.2 \$7,658 3,507 10.6 7,247 13,019 39.4 9,842 885 2.7 18,248 1,546 4.7 30,083 939 2.8 33,872 5,909 17.9 38,842 505 1.5 44.242

eight months of the fiscal year 1924. 6500 miles.

In addition to the work completed, on March 1, 1924, there were 14,136 miles under construction. The total estimated cost of both the completed work and the work under construction amounted to \$844,489,300, of which \$372,721,900 represented the federal participation. The miles completed, the average cost per mile, and the percentages are as noted above.

A Motorist's Minute

There's no question that time is a valuable commodity—but there are limits to its value. To note the way some persons drive their cars over city street in-tersections, where it is impossible to view approaching traffic, you would think their time was worth a million dollars a minute. Did you ever figure what a man actually saves in time by risking his life and that of others? A speed of thirty miles an hour covers a mile in two minutes. Twenty miles an hour takes three minutes for a mile. If you drive a mile at the rate of thirty miles an hour, you save sixty seconds over the man who follows you at twenty an hour. You have risked your life with those of others, and broken the law to save sixty seconds. What's the use?-St. Paul Pioneer Press.

Extensive Road Contracts Let in Past Month

(Continued from Page 11)

to be found on the Zion National Park highway. Paxton, Dorrity and Black, contractors, of Kanosh, Utah, were the successful bidders on this work. Their bid of \$140,727.42 being the lowest re-

August 29 bids were received for a 120-foot bridge over the Uintah river, north of Ft. Duchesne. This project is located entirely within the Uintah-Ouray Indian reservation, although on the main east and west highway. For this reason the entire cost will be borne by the federal government. C. F. Dinsmore and Company of Ogden were the low bidders with a bid of \$45,628.17, and the contract was awarded them at the above figure. Work will commence immediately on this bridge so that advantage can be taken of the present period of low water.

August 7 the contract was let for the Junction-Red Bridge road in Piute county known as Federal Aid Project No. 19-B. The Clark Construction company of Panguitch, Utah, were the low bidders on this work at a total figure of \$35,536.28 for the 5.28 miles of gravel road. Actual construction was in progress within one

week of the contract award.

This Inspection of 17,000 Culverts

It is now 17 years since the first ARMCO Culverts were installed under American Railways and Highways.

During the past few years the Armco Culvert & Flume Manufacturers' Association has inspected more than 17,000 culverts of all types; more than 7,000 of which have been photographed. The results of this investigation indicate:

1. No culverts of any materials seem so dependable—give such cer-

tain service—as ARMCO Culverts.

2. No culvert material shows greater evidence of actual permanence than ARMCO Culverts.

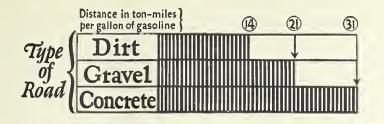
3. Year for year of life, no culverts seem so unaffected by time and service as ARMCO Culverts.

ARMCO CULVERTS

Look Under Your Roads for the Proof



The Burnham Manufacturing Company WOODS CROSS, UTAH POCATELLO, IDAHO



CONCRETE Saves Gasoline

You will find the simple chart, shown above, worth more than a passing glance. It points out a lesson in economy directly connected with every motorist's check book.

The chart shows the average ton-miles per gallon of three types of highway surfaces, as proved by tractive resistance tests conducted by Iowa State University.

Note that a gallon of gasoline carries you more than twice as far on a Concrete Road as on a dirt road and one-third farther than on gravel.

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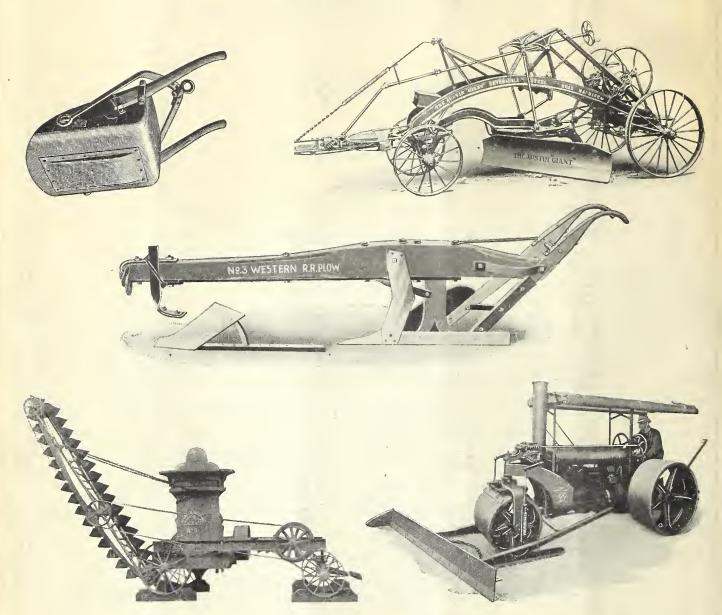
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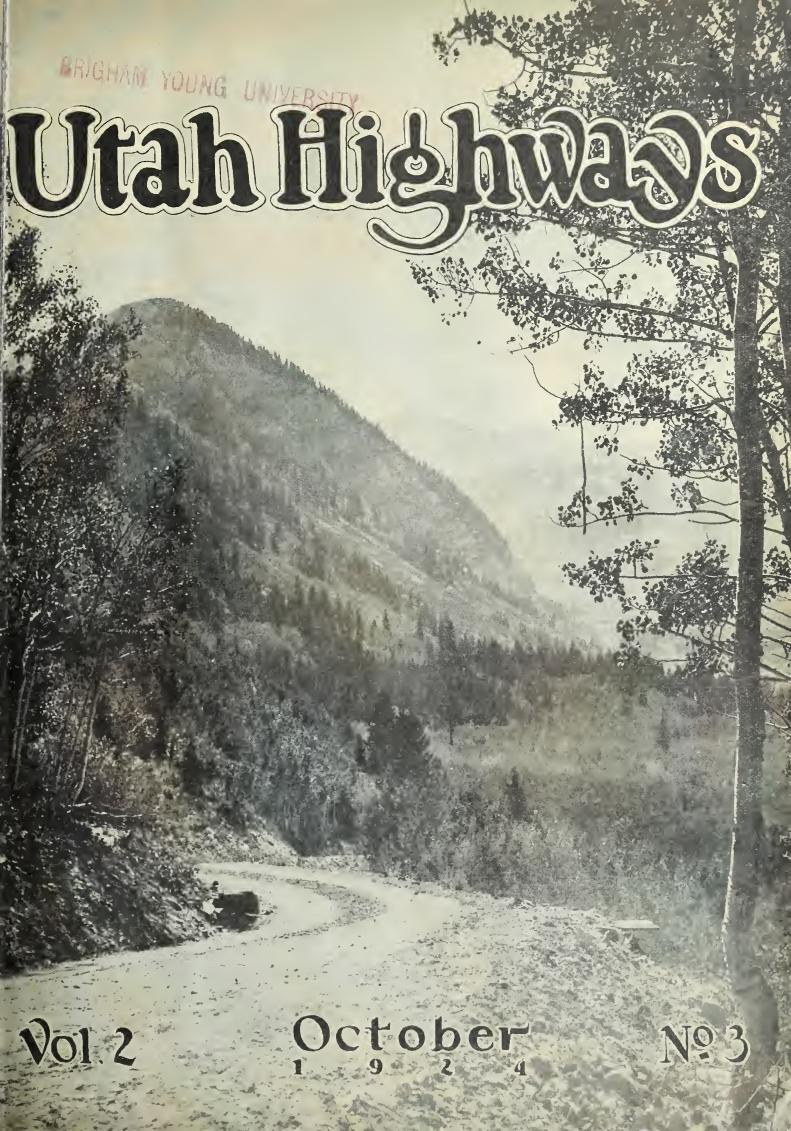
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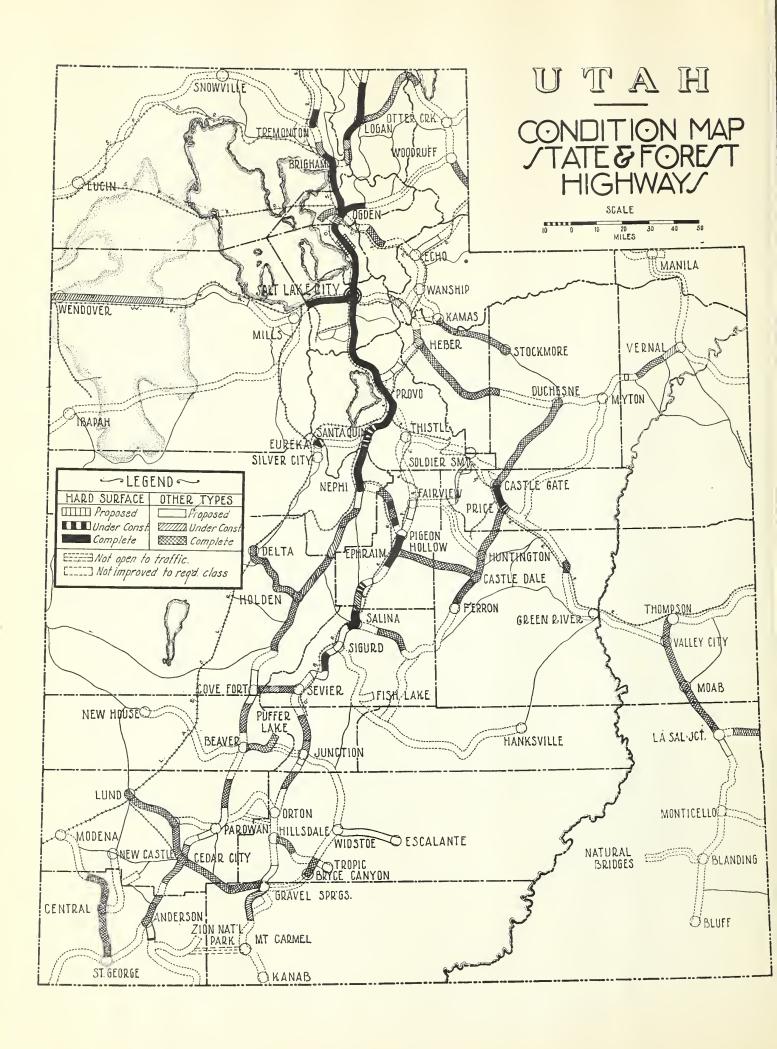
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lume 2

OCTOBER, 1924

Number 3

Crises Reached in Utah Highway Financing

By E. C. KNOWLTON, Assistant Engineer

As is being pointed out by state road icials, some of our leading citizens, and the press we find ourselves approachg a very serious crisis regarding the nancing of the construction of state ghways in Utah. This serious condion lies in the fact that our gateway ads, the ones over which tourists must avel to enter and leave our state, are most impassable. At the present time ere is no way to furnish our share of e federal aid for improving them. On is account many tourists are being rned away from our state, and those no visit us are loud in their condemnaon of our bad roads. The reason for is crisis is that the state road commis-on must depend on the taxes raised in ch county for meeting federal aid for approving all highways in that county, nd these gateway roads nearly all lead to the thinly settled and low valuation unties. Consequently, it is absolutely inpossible for those counties to raise the necessary funds, and if they would, they would not be willing to do so, as a federal aid project must be built to a standard far above that reuired for their local needs, and this local raffic is insignificant compared to the eeds of the interstate tourist traffic hich in most cases is of very doubtful enefit to these outlying counties, leaving nothing in its wake but worn out pads. It is a self-evident fact that the ne way to solve this problem is to crete a state fund, placing it at the dis-osal of the state road officials where it

As a background of what is to follow, nattempt will be made to set forth the ast history of our state road financing nd to point how the methods used have radually created this acute situation which now confronts us. Following this, he methods possible for solving the probem will be outlined, and finally an argument will be presented in favor of a tate-wide property tax as a permanent olution for our highway financing ills.

Reason for Crisis
As above stated, the cause of our troule lies in the fact that the only source of revenue to meet federal aid for construction of our roads, is that of the state road tax levied by the county commissioners in each county. If the different counties of Utah were all equally wealthy with count miles of roads. wealthy with equal mileage of roads, this plan would be perfectly satisfactory, but this condition is far from realized. (See tabulation No. 1).

From the tabulation it is seen that on the basis of the number of miles of road per million dollars of assessed valuation, there is a divergence of from 0.24 in Salt Lake and 0.9 in Weber to 59.3 in Garfield and 52.9 in San Juan county.

The wealthy and populous counties of the state lie close to each side of a line running north and south through the center, and the direction of the great transcontinental highway traffic is essentially east and west. The economical welfare of the state demands completing the north and south roads first, and by the end of the year nearly all of these roads that are in pressing need of improving that are in pressing need of improving will be completed or under contract. If something is not done to create a state

fund, the state road commission will be compelled to place the available federal aid on roads in the populous portions of the state, which could well wait for a few years, or permit federal aid to go begging while the gateway roads remain unimproved.

Below is enumerated these roads which are in the main unimproved, and the counties through which they pass, and in nearly all cases these very important roads lie in the low valuation counties.

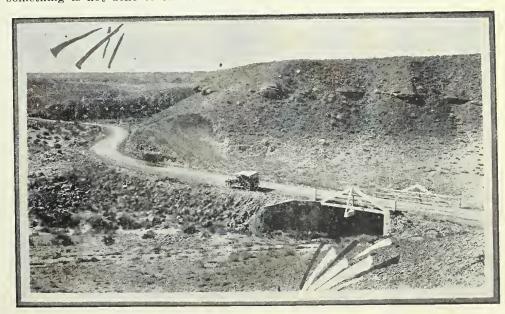
Snowville to Tremonton in Box Elder

Evanston to Devil's Gate in Summit and Morgan counties.

Echo to Gogorza in Summit county. "K" ranch to Heber in Uintan, Duchesne and Wasatch counties.

Westwater by way of Green River to Price in Grand, Emery and Carbon counties.

Lockerby to Valley City by way of Monticello and Moab in San Juan and Grand counties.



The "Twist" section, improved highway west of Vernal.

Number of

Tabulation No. 1:

Assessed Valuation of Different Counties in Relation to Road Mileage

			Number of	
		State	state road	Federal
~	1923	road	miles per	highway
County	Assessed	mileage	one million	system
	Valuation	1924	assessed	milcage
			valuation	of 1924
Beaver\$	6,430,807	95.4	14.8	33.6
Box Elder	37,399,267	207.3	5.5	42.9
Cache	31,520,791	78.1	2.5	35.3
Carbon	27,388,351	104.6	3.8	45.7
Daggett	538,726	22.0	40.8	
Davis	19,072,777	33.3	1.7	33.3
Duchesne	5,237,550	140.3	26.8	33.9
Emery	7,716,170	109.6	14.2	38.2
Garfield	2,294,225	136.0	59.3	$\frac{26.5}{2}$
Grand	4,763,106	119.3	25.0	119.3
Iron	7,411,493	181.7	24.5	61.4
Juab	17,321,648	67.3	3.9	56.9
Kane	2,216,676	63.6	28.7	19.8
Millard	16,085,407	97.4	6.1	70.4
Morgan	5,366,439	23.9	4.5	23.9
Piute	2,698,897	50.7	18.8	$\frac{20.0}{31.2}$
Rich	3,063,338	76.0	24.8	57.4
Salt Lake	256,953,167	60.5	0.24	65.1
San Juan	2,496,379	132.1	52.9	67.1
Sanpete	15,361,787	120.3	7.8	86.3
Sevier	12,059,786	148.9	12.4	65.9
Summit	16,090,811	108.8	6.8	77.0
Tooele	17,553,223	201.2	11.5	118.4
Uinta	6,540,430	63.6	9.7	63.6
Utah	52,019,520	146.6	2.8	127.6
Wasatch	8,452,728	86.6	10.2	29.7
Washington	3,137,802	165.9	52.9	93.2
Wayne	1,157,888	92.0	79.5	
Weber	58,402,294	52.1	0.9	20
Total\$(346,751,483	2921.5	4.5	$\frac{-}{1566.3}$

Notes: The state road mileage (Col. 3) in above table omits certain connecting routes not open to traffic.

The total federeal aid mileage allowed (last col.) is 1684. The remaining 118 miles are reserved for routes not decided upon pending further investigation.

Arizona line to Iron county line by way of St. George in Washington county. Wendover to Grantsville in Tooele

county.

In addition to the above strictly gateway roads, there are several whose inprovement is absolutely necessary before we can ever expect our scenic wonders in the southern part of the state to be an attraction for tourists. Among these might be mentioned:

Anderson's ranch to Zion park.

The proposed direct route from Zion park to Long valley.

The proposed route from Rockville over the Hurricane bench to Kanab.

Cedar to Long valley. Marysvale to Kanab, etc.

Concluding this point it has been pointed out that there is a great inequality in the ability of the different counties to raise funds for road work, and that as the county tax unit has to date been really the foundation for state highway financing, the highways in the wealthy counties have through the years been gradually improved more than the poorer counties until a most unfortunate condition has arisen in that these roads last named are now in a very, very deplorable condition.

The history of the state road commission financing activities come naturally in three divisions: First, period from 1909 to the end of 1916; second, the period from 1917 to the end of 1920; and third, from the beginning of 1921 to the present time. Below will be outlined the salient features of each period as pertaining to the financing.

Period from 1909 to 1916

The state road commission came into existence by legislative enactment in 1909. In evolving a plan for raising revenue for applying on state highways, it was naturally an easy way to include in the law the provision that funds be raised by each county for state road purposes by the levy of the county commissioners. This was the easy way as the constitution of the state permitted such a course and to create a fund by state wide tax would have required a constitutional amendment. It was seen at that time that some plan would have to be put into effect which would tend to equalize the great variation in the ability of the various counties to raise funds, and to relieve the situation to some extent, the legislatures of 1909-1911-1913-1915 each appropriated from the general fund of the state a specified amount annually which was to be equally divided among all counties. Each county was required to raise funds to match their share of the appropriation and for the equalizing plan the law provided that a county with an assessed valuation of under \$2,000,000 would be required to duplicate onefourth of the state's appropriation; those whose assessed valuation was between \$2,000,000 and \$4,0000,000 were to duplicate one-half of the state's appropriation; and those with an assessed valuation over \$4,000.0000 were to duplicate

an amount equal to the state's appro-

The legislature of 1909 appropris \$27,000 annually; that of 1911, \$60 annually; and that of 1913, \$97,200 nually, and that of 1915, \$100,800 nually, which totals for the eight ye

\$570,000.

In addition to the general appropriation above outlined, the 1911 legisla enacted a law authorizing a bond i for roads in the amount of \$260,000 be divided \$10,000 to each county exc ing Salt Lake county. The legislatur 1915 also enacted a law raising the tor vehicle registration fee so that the two year period of 1915 to approximately \$80,000 was realized. cluding other minor appropriations n during the period of 1909-1916, inclus the state made available in round no bers the sum of \$1,000,000 for ro During the same period the courraised in round numbers, \$2,700,000. comparison, it is seen that nearly the times as much county money was a during the period as state money. clearly indicates that the roads in populous counties were being impremuch more rapidly than in the por counties, for whereas the state fund equally divided among the counties the \$2,700,000, nearly all was raised spent in the wealthier counties as poorer counties only matched the s fund on a one-fourth or one-half ba The above procedure was perfectly nor ral for at this time the gateway rowwere practically of no importance even at the end of this period transco nental traffic had just begun and the was as yet no great demand for use these outlying roads on our boundar These facts are presented, however, show that the program all during period was gradually leading us to serious condition now before us.

Period from 1916 to End of 1920

This period might be called "S Bond Issue Period." During 1917, 1 and 1919, nearly all of the states in Union floated almost unheard of bissues for highway purposes. This issues for highway purposes. the period of inflation, and also the periences in Europe during the taught us that it was the good highw of France that won the war and brou us face to face with the fact that American highways made up a very

adequate system indeed. The state legislature of 1917 autized a \$2,000,000 bond issue of 20-y bonds, and that of 1919, an issue \$4,000,000 of 20-year bonds. In a tion to the state bonds, the counties the state authorized very large bond sues which were to be issued part the state and part for county ro Tabulation No. 2 shows the county b issues for state and county roads up and including the year 1923. Fr available records it is not possible state accurately the county bonds ra during the period in question but a g approximation would place the sum \$350,000 as the total bond issues ra by counties up to and including 1! \$4,350,000 for the period of 1917 to 1 inclusive, and the remainder, sum of \$673,950, for the period 1921 to 1923, inclusive. During period then, there was raised bond issues in Utah for state rolly the state requirement \$6,000,000. by the state government \$6,000,000;

Tabulation No. 2:				
unty	Bond	Per	Cent Date of Matu	rity
er\$	125,000	6	1940	
Elder	140,000	$4\frac{1}{2}$	1932	
5	300,000	5	1927 Tota	1 600,000
E	300,000	6	1947)	11 000,000
ſ	30,000	5	1920)	
	31,000	5	1925	
on {	125,000	5	1939 } Tota	al 496,000
	150,000	5	1940	
	190,000	6	1941	
sett	7,000	6	1942	
S	50.000		1941	
lesne	50,000	6 5	1941	
ry	35,000	Э	*******	
ield	8,500	5	1932)	
d	10,500	5	1934 Tota	al 97,500
14	78,500	6	1930–1940	ai 01,000
	150,000	$\ddot{6}$	1940	
•	225,000	6	1932-1942	
3				
rd	310,000	6	1939	
ran	*		******	
9	18,000	6	1940	
••••			*******	
Lake	220,000	4½ to 5	1922 to 1926 \ Tot	al 1,640,000
(1,420,000	5	1021 00 1000	ai 1,040,000
Juan	1,450	5	1934	
pete	210,000	6	1925-1940	
er _.	240,000		1942–1943	
mit			*******	
ele	140,000		******	
ah	$148,000 \\ 600,000$	5 5	1940	
1	,	Э	1940	
atch	56,000	5 1/2	*******	
hington	-	3 72		
110	180,000		1941–1944	
er	100,000		IOII IOII	
Total	\$5,358,950			
10041	,500,000			

state and county roads by the counapproximately \$4,500,000 more and addition to this by the county units usual state road taxes. The federal law went into effect in 1916 but, the end of 1920 but little advantage taken of this fund, only about \$200, being actually received from the ted States treasury by the end of 0. This was due in part to the diffiy the state department had in getgraphical aid law; also the unfortunate visions in the first law that federal could only be applied on roads over the mail was carried. This, together he fact that the commission had ple funds from the bond issues reted in only a half-hearted effort to ain federal aid.

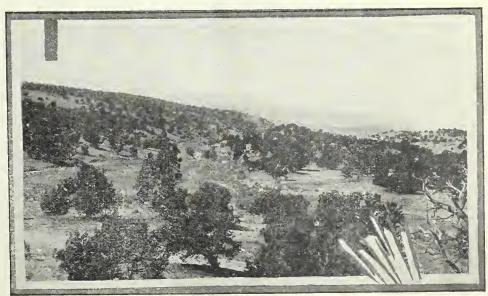
As a summary, we find that there was bended on state roads from all sources this period, a total of approximately 200,000. Looking back from the presit appears indeed a calamity that gateway roads could not have been proved with a part of the large sums allable at this time. It is true that me work was done upon them which asisted of grading mainly on the mountous sections, and also for the conuction of structures where such were solutely necessary. At this time transposition traffic was beginning to asme large proportions and a cry was now heard for improving the roads in dout of our state, but this cry was owned out by the incessant demand for vement. It is sad, but true, that the eater supply of funds for the "Golden

Age" of our financing history was spent upon hard surfaced roads, and these mainly in the central or populous counties. This desire for pavement was so strong that at the end of the period we had in the state more paved roads than any other state in the intermountain west and as much as several of them combined. Thus was lost the wonderful opportunity of the state road commission to use a part of this great sum of state funds which was in their hands in the outlying counties. If this had been done

our entire system could have been more nearly worked out on a consistent plan, and the inequality of the ability of the counties to raise funds would have largely been overcome, and our gateway routes would not now be a disgrace to us. The result of the plan followed during this period aggravated the condition existing at its beginning which was that the roads in the populous counties were being largely improved while those on our boundaries were neglected.

Period 1920 to 1924

At the end of 1920 nearly all of these state funds created by bond issues were spent and many contracts entered into for additional work without funds at hand to pay for the same. Federal aid at this time had been allotted to Utah to the amount of nearly \$2,000,000 and only approximately \$200,000 had been actually received. The larger part of the remainder was not under agreement and unless this was met with local funds and placed under agreement within stipulated time, it would be forfeited by the In this dilemma the legislature of 1921 was asked to authorize an additional bond issue of \$1,000,000 which was done in due course. Nearly all of this done in due course. Nearly all of this \$1,000,000 was used to take care of obligations previously made. This left the road commission without funds for additional construction, so that during this period all new work was financed by the counties matching federal aid. The new federal aid law of 1921 changed the rate of participation of this state from a 50-50 basis to that of 74-26 so that where federal aid funds previously must be matched dollar for dollar, the new law made it possible for each dollar of local funds to match \$3.00 of federal aid funds. This law was made retroactive to apply to the federal funds previously allotted to Utah. It is quite certain that if such a change had not been made considerable federal aid would have been lost to us as it would not have been possible to find local funds to match it be-fore our right to it would have elapsed. By encouraging the counties which were able to match federal funds our federal aid money was all saved. However, this situation created an unfortunate condition. The few counties which had funds



Needing improvement—one of Utah's eastern gateways.

to spare to match this federal aid wanted pavement and the hard surfaced type at the rate of \$30,000 to \$35,000 per mile would use up the surplus federal aid so as a result, during 1922 especially, a very large mileage of pavement was put under contract and this in the populous counties, this adding more pavement to our already over-paved system, while the outlying roads continued to suffer. Summing up the financial activities of 1921 and 1922, the records show that there was received for expenditure on state roads \$6,480,599.15, of which approximately \$2,500,000 came from state road taxes in the counties and from county bond funds; approximately \$2,000,000 from the government as federal aid, and the remainder of approximately \$1,500,-000 from state bond issues.

The year 1923 the road commission of the state passed through the darkest period of its history. There was not a dollar of state funds in existence for construction or maintenance, this condition existing for the first time since this body came into existence. The legislature of 1923 passed a gas tax law of 2½ cents per gallon on gasoline sold in the state, but the registration fee was simultaneously lowered. It was planned that the gas tax and registration fee combined furnish enough revenue to retire the \$7,000,000 bonds and what might be left over was to be used for maintenance. But, even when collected, the gas tax could not be applied on roads until the beginning of 1924.

A glaring example of the result of the county taxing unit was now before us. The road commission was powerless to maintain our roads as the funds must come from the counties. As a result, the counties which could afford it, and they were all passing through a serious depression, were willing to attempt to maintain the roads which served the local needs, but in many cases roads in the different counties which were not used much by county citizens, but which formed important links in the state system, were not maintained. The poorer counties, many of them with relatively large road mileage, were struggling to raise funds to keep their roads passable, and as a fitting climax to this condition we have the picture of the road commission endeavoring to persuade some poor outlying county, whose people were suffering to the utmost from financial depression, to raise funds to maintain a road within its borders which was being worn out chiefly by the stream of transcontinental traffic.

The only redeeming feature of this period, 1923, is the new type of gravel road. Gravel roads had been built in Utah ever since the state was settled but this new type was the old gravel road with scientific methods of selec-tion of materials added to it. The adoption of this type as standard for construction was delayed too long in Utah, Idaho adopting it a few years before, but it saved the day at last. Being comparatively cheap in first cost it enabled the road commission to spread out its available funds over a remarkably large mileage, and every citizen of the state, who has traveled over these roads, will bear testimony to the wisdom of this plan of construction. Also, to date, the federal aid has been well taken care of Tabulation No. 3:

	Federal Aid	Federal Aid	Perc
	alloted	received	of Fed
Year	up to	up to	Ai
	June 30	Nov. 30	Recei
1917	\$ 56,950.15	***************************************	
1918	170,850.43		
1919	909,205.72	\$ 44,451.84	5
1920	1,987,630.72	200,743.98	10
1921	3,117,206.38	935,524.40	32
1922	3,966,623.59	1,912,860.17	48
1923	4,532,901.73	2,936,887.10	65
1924	5,268,729.10	(a) 3,517,953.24	66
	·	(b) 4,186,887.10	79

This amount includes vouchers now in transit and in course of prepara

This is the total estimated amount up to November 30, 1924.

as it becomes available. Tabulation No. 3 shows the status of our federal aid allotments and the progress with which they have been taken up by the state over a period from the beginning of federal aid in 1917, to date. Up to the end of 1922 approximately \$16,500,000 had been expended on our state road system and the enormous investment was suffering irreparable damage due to the financial plan under which the state highway department was operating.

For the year 1924 the gas tax of 1923 became available, but was about onehalf enough to go around so that each county has been asked to match this gas fund on a 50-50 basis. The state fund of approximately \$150,000 has been indeed a blessing and a great improvement has been made in maintenance throughout the state. But by the end of this year the crisis so often mentioned in this article will be at our doors. As already stated, by that time all the roads in the counties which can afford to raise funds to match federal aid, which really need improvement, will be taken care of and the outlying counties through which our gateway roads pass cannot possibly raise funds to meet their share for improving them. The commission is thus faced with a proposition of letting federal aid go begging or apply it upon roads which really do not need present improvement. If our road program is to progress and even in a small degree keep up the ever increasing demand made by traffic, the coming legislature must do something to relieve this condition. In the remainder of this article will be pointed out what is considered by authorities to be the proper financing plan for a state highway department, and after this the methods which might be used for meeting the situation.

Ideal Highway Financing Method

The modern highway can be considered as a business institution rendering and possessing service to the people definite earning capacity. If financed soundly and wisely in its construction, its type adapted properly to the traffic it is expected to bear, it will surely render large dividends upon the investment. The laws of economics cannot be long disregarded any more so than the physical laws of nature without bringing disaster. Those of our states which have adopted a sound financial policy are succeeding and those without such a policy are going along in a "hit and miss" manner, and each session of the legislature is called upon to provide a new part to the financial machine which has broken down during the interim due to wear tear caused by improper original sign.

Almost unbelievable sums have raised during the last ten years in United States for highway work and proximately \$1,000,000,000 per yes our present road bill. This great m ment has come upon us so rapidly it is hardly to be expected that the nomic laws underlying it are absolu However, certain quite understood. nite conclusions have been accepted authorities on the subject and probthey have not been to date better pressed than by Mr. Thomas H. Mc ald, chief of the bureau of public re in an address delivered before the arconvention of the Virginia Good Rassociation at Roanoke, Va., Jan

29-30, 1923: It is not fair to lay any one class a part of the cost die portionate to the benefits it receives. I will go further and say that when are voting for highway bonds, it is wise to obligate all the money that be derived by taxation of the road to pay the interest charges and re You will need mone the bonds. maintain the roads when they are he and it is especially appropriate to dethe money raised by taxation of the user to this purpose, for two reast First, because it will be raised in c proportion to the use of the roads therefore in proportion to the need maintenance; and second, because, the rate is fixed, the return will be tomatic, thereby assuring a continu source of revenue for maintenance, vi to be efficient, must be continuous.

"I do not mean to say that no parthe revenue raised by taxation of road user should be devoted to const tion, but merely that from it there sh first be set aside an amount suffice to pay for maintenance and that the revenue derived from this source si not be out of proportion to the berg derived from the direct use of the r If a balance of such funds, fairly ra remains after the maintenance rec ments have been provided for, there be no objection to applying it to struction.

"The wide variation in the pr status of highway development in several states prevents the adoption a uniform policy for securing the: necessary to the annual highway by and expending these funds. Gene speaking, however, these principles be enunciated. 

Pavement on Arrowhead Trail, F. A. P. 50, Utah county.

"(a) States in the initial stage of highway development should issue bonds to defer that portion of the annual charge for construction which would overburden either property or the road

States where original construction programs are well under way, can in the main, finance expenditures for construction by bond issues devoted to deferring the cost of special projects.

"(c) States where original construc-tion is practically completed are con-cerned chiefly with maintenance and reconstruction and should depend on current funds, save in cases of emergency.

"(d) The maintenance of interstate and state roads should be a charge against the road user.

"(e) Roads serving a purely local purpose will generally require only light upkeep and this should properly be a charge against the adjacent property, which in this case is the first and often

the only beneficiary.

"(f) No road should ever be improved to an extent in excess of its earning capacity. The return to the public in the form of economic transportation is the sole measure of the worth of such im-

provements.

In discussing the subject of highway financing before the American Association of State Highway Officials in their convention at New Orleans, December 3-7, 1923, Mr. J. W. Mackall, chairman of the highway commission of Maryland, after quoting and endorsing the above mentioned principles outlined by Mr. McDonald, continued as follows:

However, when we pause to consider the great extent to which the user of the motor vehicle is being called upon to pay the cost of construction of roads, in some cases on the pay-as-yougo plan, and in other cases on the bond issue plan, it causes the speaker to wonder if the placing of the burden upon the road user is not going to, in a very short time, be far in excess of the onethird recommended by this association at

its last convention.

"The tax upon motor fuel is one which is easily collected and willingly paid. Any tax which is paid from day to day is relatively a popular tax. Let us hope, then, that simply because the tax on motor fuel is one which the motorists is willing to pay that we are not going to saddle on him so great a burden that he will in the end refuse to pay. * * *
"The alarming thing about the recent

tendency in the financing of highway construction and maintenance is the extent to which automobile license fees and the gasoline tax receipts are being used to finance relatively long term bonds for construction. If the excess of receipts from the motor vehicle user over the maintenance cost were used annually for construction, certainly it could not be criticized by any man. this is the best of business, but to issue bonds running over a long term of years and set up as the first call on the receipts from the motor vehicle user sufficient to pay interest and amortization on these bonds is insuring that the proceeds from the current receipts from the motor vehicle user cannot be used for road maintenance as the need for road maintenance and reconstruction continues.

"The speaker believes that it is fundamental that all maintenance and reconstruction be cared for from current receipts, and he believes that it is equally as fundamental that no prior charges be made against the prospective current receipts which could in any way prevent these current receipts from coming in sufficient volume to pay the mainte-nance charges on all the improved roads

in the state * * *

"The speaker will be pardoned for referring at this time to the little state of Maryland, but the point can be best illustrated from his point of view by citing the experience in Maryland for the last 15 years. The road construction program in Maryland has gone forward since 1908 at the rate of about two million dollars per year. All construction has been from bond issues on the serial annuity plan, full matured in 15 years, interest and amortization paid from the general taxes of the state.

"Maryland today has a registration fee of 32 cents per horse power and a motor vehicle fuel tax of 2 cents per gallon, which is equivalent as revenue produc. ing agencies to a registration fee of 60 cents. Its rate is about as high as any state in the Union, its ratio of automobiles to area or to road mileage is far above the average of the states, yet it takes all of these funds for the maintenance of its roads, and it is a most for-tunate thing that its construccion bonds were paid from the general taxes of the state. * * *" state.

In leading the discussion of the paper above quoted, Mr. Paul D. Sargent, chief engineer of Maine, made the following

comments:

"* * * I desire to emphasize especially Mr. Mackall's criticism relative to using motor vehicle fees and gasoline tax receipts for financing long term bond issues for road construction and to endorse his plea for the issuance of relatively short term serial annuity bonds financed by a general property tax. Mr. Mackall should not ask our pardon but rather receive our thanks for illustrating this point by telling us how Maryland has financed its state road construction and maintenance program. * * *"
The Motor Vehicle Conference commit-

tee, composed of the chief national automobile clubs of America has published an article entitled "Special Taxation for Motor Vehicles." The following quotation is presented from this publication:

"Irrespective of the particular form of special taxation any state may adopt, whether annual registration fees based on horse power, weight or similar factors, or motor fuel taxes, the aggregate amount of these special taxes upon the motor vehicle in any one year should not be more than is necessary to finance:

"(a) The administration of the state

motor vehicle department,

"(b) The maintenance of improved

highways of the state."

The state of New Jersey long ago adopted a financing plan for highways, which has been commended favorably upon by many authorities. Stated briefly New Jersey's plan is as follows:

"1. Society-as-a-whole to pay for the

construction of improved highways by

means of general taxation.

"2. This policy of general taxation for construction to apply whether cash (paybefore-you-use) or bond issue (pay-while-you-use) method is employed.

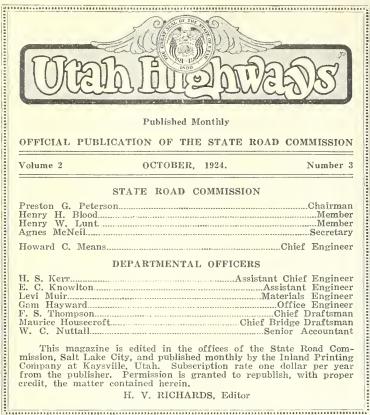
"3. Proceeds from registration fees or other special levies on motor vehicles to pay for the maintenance of improved highways"

highways.

As further emphasizing the point of view of the automobile association, the following quotation is presented from an address delivered by Mr. Alfred Reeves, general manager, National Automobile Chamber of Commerce, before the Good Roads association of New Jersey at Newark, December 5, 1923:
"New Jersey is certainly to be com-

mended on having adopted and strictly adhered to this wise policy of highway

(Continued on Page 7)



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STATE ROAD COMMISSION

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H. V. RICHARDS, Editor

THE NEED OF A STATE FUND FOR HIGHWAY CONSTRUCTION

A good road makes motoring both a pleasure and comfort. Its material advantages to the community it serves are evident with its coming. No less important are those intangible benefits which enhance the social welfare and enlarge the view where bad roads have circumscribed the horizon. As a corollary it is an irksome fact that good roads do bring out in sharp relief the deterrent qualities of poor roads that have previously been allowed to serve.

sly been allowed to serve.

Utah has an extensive mileage of excellent roads, as

Up as can be made. Up nearly perfect of their respective types as can be made. and down the two main north and south arteries residents and tourists are loud in their praise of the many miles of pavement and the gravel surfacing of a kind that beguiles the most law abiding into stepping on the gas. Leading from these are fine roads built by the forest service through our canyons and in and about the numerous places of scenic

interest.

However, there is another side to the story. E. C. Knowlton, assistant engineer, describes in this issue the obstacles that absolutely prohibit the build-ing of uniformly ing good roads on the state road system under our present highway laws and offers remedial suggestions that should be understood by every citizen who wants more and better roads.

There may something in the world more difficult than trying to build highway state system where federa aid must be matched with coun-



An indifferent canyon road near the eastern boundary.

ty funds, but if so your state road commission does not know what it is.

A modern "Arkansas Traveller" in a recent issue of Arkansas Highways describes a trip he took with his faithful flivver over the highways of a neighboring state. "The farther west I journeyed the worse the roads became. Here, truly, were the "vast expanses" of which the poets have sung. Expanses where the sand hill, the sand storm, sand hole, sand rock, sand burr, sand flea, sand crab, sadness and sorrow reigned supreme. Where the horned toad vied with the rattlesnake, prairie owl and prairie dog for the meager shade of the stunted mesquite bush, and all were calloused and sunbaked, indifferent to death, but apparently doomed to live forever. But oh! the return of its joys!—The near of the return o Arkansas the higher my spirits rose, and the stronger grew my desire to live-

Due to the climatic and geographical conditions Utah roads do not traverse such sandy alliterations but we do have the "vast expanses" which must necessarily be traversed on most every highway entering the state and through counties that are unable or unwilling to build or maintain the kind of roads

that interstate traffic expects.

Mr. Knowlton points out clearly the defect in the state law that has led to this condition and shows that it is necessary, if we are to escape from our present dilemma, that we have a state wide road tax, the revenue therefrom to be expended on the roads at the discretion of the state road commission, where needed. He also shows that such a tax will be more equitable and can accomplish the desired results at a total less cost than our present arrangement whereby state road funds must be

raised and expended by the counties.

At the next session of the legislature ways and means will doubtless be considered for improving the present situation in regard to the financing of state highway construction. The easiest and most obvious recourse would be, of course, to raise the rate of the gasoline tax. So far as this would enable us to maintain the roads more efficiently such a tax would be fair. In highway financing it is generally agreed that the automobile should pay for the upkeep of the roads. However, our biggest problem is that of highway construction, the revenues from the motor vehicle and gas taxes are already burdened with meeting the construction costs under our state bond issues, and additional funds for this purpose, it is pointed out in the accompanying article, should come from a state wide general property tax. Half of the states in the union have already adopted this means of raising revenue for state highway construction, abolishing as archaic and inequitable the development of a state-wide road system by county units.

The need of some plan whereby a consistent and logical development of a state highway system is evident to anyone who travels the roads entering the state. It is not sufficient to have good highways connecting our populous localities. The volume of interstate traffic, its economic value and the competition of alternate routes, all require that we meet our

interstate connections with good roads.

Under our present method of procedure it has been necessary to match federal aid funds, on the basis of 74 per cent federal to 26 per cent county money wherever such local funds funds could be had, with the consequent delay of needed improvement on several roads of interstate importance.

Few highway prowhen posals fail correctly understood taxpayers and the need of the remedy herein recommended, and which will require a conamendstitutional ment to effect it, is clearly demonstrated. It is imperative.

financing which, in the judgment of the industry which I represent and of economists who have made thorough investigations and study of the facts involved, is best calculated to provide a sound basis for the scientific and equitable distribu-tion of the money burden of highway construction and maintenance between society-as-a-whole and the motor ve-

As demonstrated by the above quotations, there is not an absolute unanimity of opinion on the question of highway financing due mainly, of course, to con-flicting financial interests. The consensus of opinion among highway officials in the country is that the automobile should pay for all maintenance, and if there should be any funds left over, they might well be applied to construction. In expressing this as a body, the American Association of State Highway Officials in their 1922 convention went on record as in favor of the plan under which at least one-third of all revenue received by the state for highway purposes should come from the motor vehicle. On the other hand, from the automobile point of view, comes the idea that the motor vehicle should only maintain the roads, and revenue from general property taxes should furnish funds for construction. However, in summing up the matter there are certain definite principles outmodern experience and supported by ecostanding which are backed up by our nomists and highway authorities. The principles might be stated as follows:

1. Bond issues for highway construction during the initial stage of the state highway program are very proper but where the original construction is well completed, the pay-as-you-go plan should

be adopted.

2. The funds from bond issues should never be used for anything but permanent construction and never for mainte-

3. Revenue from the motor vehicles in the form of registration fees or fuel tax should not be used to furnish interest on sinking fund on bonds.

4. The motor vehicle should be called upon to furnish all funds for maintenance and reconstruction of roads.

5. Revenue from motor vehicles might be applied upon construction after all demands of maintenance are taken care of. (This is opposed by the Automobile associations).

All of the interests of the state are benefited by highway construction and the bulk of the funds for this purpose should come from the general prop-

Utah's Highway Financing Plan

It is interesting to note how the high-way financing plan of our state measures in the scale of the above principles. We have issued a large amount of bonds considering our valuation, and our construction program in the populous sections of the state is quite well under way. If in the future, federal aid continues at the present rate, we shall be able to proceed on a pay-as-you-go policy providing a construction fund is made available that can be placed upon our outlying roads which are in the poorer counties. Considering the high bonded indebtedness of our state at present, it is of course out of the question to consider any additional bond issues in the near future, so that in this state a pay-

as-you-go policy is our only alternative. The same procedure was adopted by the legislature in creating ways and means of raising funds for retiring our bonds as was used when the county taxing unit was adopted, as the initial step in our highway financing plan, namely, the easiest way. At the time the bonds were authorized, the motor vehicle registration fee was beginning to amount to a substantial sum in this state. It was the easiest fund to appropriate for retiring the bonds, consequently it fell vic-tim. In this, then, the legislature adopt-ed a principle which is in plain violation of one of the cardinal principles of highway financing, and as a result, up until this year when \$150,000 of gas tax money became available, we were proceeding contrary to the accepted principles in that while the entire revenue from the motor vehicle was furnishing funds for retiring bonds which had been used mainly for construction, our state road taxes raised in the counties were being used to maintain the roads.

Instead of a state wide property tax which is declared by authorities to be the proper source for funds to be used to retire highway bonds, we have as the only property tax for highways this county state road tax which cannot be used for this purpose. And as has been stated before, the county tax has the other fundamental disadvantage of preventing the creating of a state fund to be applied where most needed. Summing this up then, our state financing plan runs contrary to accepted highway principles in that:

1. We are using most of motor ve-

hicle revenue to retire bonds.

NO CHAIN IS STRONGER THAN IT'S WEAKEST LINK

No road is better than it's worst section

B ECAUSE good roads are a potent factor in the development and progress of our State, Utah's future growth and prosperity demand a

SYSTEM OF GOOD ROADS DESIGNED TO SERVE THE ENTIRE STATE

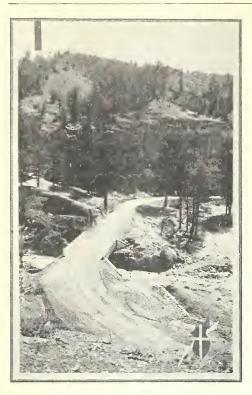
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"The Lumbermen"

SALT LAKE CITY



UTAH



A new forest road in Red canyon.

2. We have no state property tax for this purpose.

3. Our property tax is on the basis of the county unit preventing the creation of a state fund to equalize the inability of the counties to raise highway funds.

Gasoline Tax

In 1919 an excise tax on motor fuel was levied for the first time in the United States. This plan once put into operation became so popular that it has swept the country by storm. From Tabulation No. 4 it is noted that to date there are 35 states in the Union having such a tax, which ranges from 1 cent to 4 cents

per gallon.

The chief reason for its popularity and wide spread adoption are, that it is equitable in being an actual measure of the road use by the motor vehicle, and also relatively painless tax in that it is paid every day instead of at the end of the year. These reasons with the fact that there exists the general conviction that property is taxed high enough, and that additional revenue as needed for good roads should come from the motor vehicle, are sufficient cause for its popularity. This tax of 21/2 cents per gallon was created by the legislature of 1923, and put into operation in March of that year. The legislature of 1921 had increased the motor vehicle registration fees to a point high enough to furnish funds for retiring the bond issues, and in adopting the gas tax the registration fee was lowered so that it and the gas tax would furnish funds for retiring the bonds, and still supply some additional funds for maintenance of roads. Tabulation No. 5 indicates the gross receipts from the gas tax for the five months of 1923. The year ends with the November taxes, as the December revenue is not due until January 15. In 1921 the receipts from the registration of 47,495 motor vehicles in Utah totaled \$440,-436.36; in 1922, from 48,869 motor vehicles, \$747,902.60, and in 1923 from 66.- 025 motor vehicles, \$483,824.96. The totals from the gas tax and registration fees for 1923 approximated \$900,000.

The fixed charges on bonds, that is, interest and sinking funds for 1923, amounted to \$675,000. This leaves a surplus of approximately \$225,000 to be applied for administrative and motor vehicle law and for maintenance of roads. In round numbers \$150,000 was made available for maintenance purposes. It is conservatively estimated for 1924 that a total of \$625,000 will be received from the gas tax, and \$480,000 will be received from the registration fees. The fixed charges on the bonds for the year will be about \$725,000, which leaves a surplus of \$380,000 of which, approximately \$325,000 can be applied for maintenance. This condition fulfills the expectations of the legislature in that the motor vehicle is furnishing sufficient for retiring bonds and about enough for maintenance of the state roads. This state fund for maintenance will cause very radical changes in maintenance conditions in this state. Up until now the maintenance work has never been wholly centrally controlled, as the county commissioners in each county, from the fact that they furnished part of the maintenance funds, have exercised more or less supervision over maintenance work. This has made it impossible to create a central state maintenance organization. Also, another very serious evil of the former system was the fact that in the poorer counties, especially the boundary roads which were used mostly by foreign tourist traffic, did not have any chance of adequate maintenance as these counties rightly refused to furnish their funds to maintain these roads even if they were able to do so.

The article up to this point has pointed out the serious plight we find ourselves as a state being unable to finance our important boundary roads. The causes

Tabulation No. 4:

STATE	MOTOR VECHICLE FEE ON DODGE TOURING CAR		COST OF FEE PLUS GAS TAX ON 500 GALLONS		
ALABAMA	2 CENTS	\$18.75	\$5 \$10 \$15 \$20 \$25 \$30 \$35 \$40 \$45 \$50		
ARIZONA	3 39	5.00			
ARKANSAS	4 11	22.00			
CALIFORNIA	2 33	3.00			
COLORADO	2 "	5.00			
CONNECTICUT	1 "	17.04			
DELAWARE	2 33	19.00			
FLORIDA	3 "	13.00			
GEORGIA	3 "	13.65			
IDAHO	2 11	20.00			
ILLINOIS	0 "	8.00			
INDIANA	2 "	5.00			
IOWA	0 11	1980			
KANSAS	0 11	11.50			
KENTUCKY	1 "				
LOUISANA	1 "	16.61			
MAINE	1 22	18.36			
1111 1111	2 "	12.50			
MARYLAND	0 "	7.68			
MASSACHUSETTS	0 "	10.00			
MICHIGAN		16.20			
MINNESOTA		24.20			
MISSISSIPPI	1 "	13.00			
MISSOURI	0 11	11.00			
MONTANA	2 "	15.00			
NEBRASKA	0 "	1 2.50			
NEYADA	4	11.55			
NEW HAMPSHIRE	2 "	15.30			
NEW JERSEY	0 "	9.60			
NEW MEXICO	1 "	9.60			
NEW YORK	0 "	13.00			
NORTH CAROLINA	3 "	20.00			
NORTH DAKOTA	1 "	12.00			
OHIO	0 "	8.00			
OKLAHOMA	1 "	13.00			
OREGON	3	34.00			
PENNSYLVANIA	2 "	10.00			
RHODE ISLAND	0 "	15.25			
SOUTH CAROLINA	3 "	10.00			
SOUTH DAKOTA	2 "	17.00			
TENNESSE	2 "	12.02			
TEXAS	1 "	18.20			
UTAH	22 "	7.50			
VERMONT	1 "	22.10			
VIRGINA	3 "	14.40			
WASHINGTON	2	17.20			
WEST VIRGINA	2 "	18.08			
WISCONSIN	0 "	13.00			
WYOMING	1 55	12.00	\$5 \$10 \$15 \$20 \$25 \$30 \$35 \$40 \$45 \$50		

Average cost of motor vehicle tax and gas tax in each state.

of these then have been presented and our present financial system critically analyzed. After having presented the diagnoses, the next step is to find a cure for our ills, and immediately must be found a state fund with which to match federal aid for construction work. Then must be worked out a permanent plan for a proper distribution between revenue from general property and the motor vehicle.

Additional State Bond Issues
The state of Utah is now bonded to

The state of Utah is now bonded to the amount of \$9,500,000. The constitutional limitation of $1\frac{1}{2}\%$ of our assessed valuation, or for 1923 the maximum bonded indebtedness would be \$9,701,272.25. Hence, it is seen at once that additional bond issues cannot be considered as a means of solving our problem.

Tabulation No. 5: Gas Receipts for 1923 March \$13,177.23 May June 45,788.80 66,728.03 July ----66,821.05 August 59,785.80 September 62,629.62 October November 58,470.09 45.804.29 Total \$445,298.81

Appropriation From General Fund

One course open for the legislature would be to make an appropriation for highways from the general fund, as was done during the period from 1909 to 1916. It will require an annual fund of \$250,000 at least to match federal aid and for construction. Our allotment of the 1925 appropriation of federal aid was \$850,000. A fund of \$250,000 would match on a 74-26 basis \$750,000, making a construction fund of \$1,000,000 which, beginning with 1925, could to a great extent, be placed to advantage on our gateway roads. The objection to this will be, of course, that this tax will be added to the existing property tax and no doubt considerable opposition would be raised against it. But is such a po-sition well taken? The American Assosition well taken? The American Association of State Highway Officials is on record as favoring a distribution of revenue for highways so that the motor vehicle pays about one-third of the total amount. This year the motor vehicle will turn in to the state treasury in fees and gas tax, approximately \$1,100,000. If the state road tax for the counties in 1924 should remain the same as 1923, and it will probably be lower, the revenue from this source will be but approximately \$630,000. Hence for 1924 the motor vehicle is supplying two-thirds of the total state highway revenue. In the light of these figures and the commonly accepted theory of financial authorities on the subject, the legislature would not err in adopting this course.

Increase of Motor Vehicle Revenues

Another course open is to increase the gas tax or registration fee, this increase to be used as a construction fund. Tabulation No. 4 is presented in an attempt to show at a glance a comparison between all of the states in the amount of special taxation against the motor vehicle, by special taxation being meant the regis-

tration fee and the motor fuel taxes. The most striking thing shown by the tabulation is a variation between the states. Not only is this variation found in the amount of taxes but, in the case of registration fee, in the basis used for obtaining it. In the different states there is used as a basis for computing the registration fee the purchase price, the weight, the weight plus capacity, the horse power, and a combination of the above. This being the case, it would require a large article dealing solely with this subject to make a complete analysis showing actual comparison between states as to registration fees of passenger cars and motor trucks, etc. For purpose of tabulation No. 4, I have taken as a typical case a Dodge touring car which weighs approximately 2500 pounds, is rated at approximately 28 horse power, and has a factory purchase price of approximately \$900. Using these valuations, I have obtained the amount which would be charged per year in each state as a registration fee. Then to take into account the sum of the registration fee and gas tax to obtain the total amount of special tax against the typical car, I have assumed 500 gallons as an annual consumption, and at the gas tax rate of each state compiled the total taxes for the year. Adding this to the registration fee, the tabulation shows graphically the total special tax on the typical car for the year. It is not claimed that this comparison is an absolute relation between the motor vehicle fees of the different states, but it is near enough for the purpose of comparison.

It is seen that the total yearly taxes on the typical car varies greatly in the different states, ranging from \$49.00 in Oregon to \$8.00 in Illinois. The total in Utah is shown to be \$20.00, which is made up of \$7.50 registration fee and \$12.50 for the gas tax. If the legislature should decide that an appropriation from the general fund is not desirable, it seems quite plain that the only hope for a state fund for construction, which now is needed so badly, is in raising the total tax against the motor vehicle. An additional one cent per gallon to the 21/2 cents now in force would raise the total for the typical car to \$25.00. Even then there would be thirteen states in the Union with a higher total tax against the motor vehicle than we would have. This one cent raise would increase the total revenue from the gas tax by approximately \$250,000, the annual amount now necessary for this construction fund.

Summing up the matter, there are two courses open to the legislature:

- 1. To appropriate from the general fund an amount necessary to match federal aid for construction of these gateway roads.
- 2. To increase the gas tax from $2\frac{1}{2}$ cents to, say $3\frac{1}{2}$ cents, which would furnish \$250,000, the amount needed as a construction fund.

In the opinion of the writer, either of these plans should only be considered as a temporary expediency, only another patch in the much patched financial cloak. To finish the job and make possible a permanent sound financial plan, the legislature should authorize for submission to the voters, an amendment to the constitution providing for a state wide tax for highway purposes, and if

the plan of increaing the gas tax is adopted, a neglect of doing this would place our highway financing plan still further away from the correct principles of highway economics.

State Wide Tax

As with the gas tax, the state wide tax for highways is also a comparatively new innovation and only came into existence with the great advent of the modern highway movement and the creation of state highway departments. Fifteen years ago there was no such tax in any of the states, and at present over one-half of them have such a tax in operation ranging from ½ to 4½ mills. Tabulation No. 6 shows the states having such a tax, the amount of the tax and the funds raised from the same. This information is obtained from the 1921 year book of the American Automobile asso-

Tabulation No. 6:
Tabulation Showing States Using the

	State	Wide	Highway	Tax ·
			Rate	Estimated
			Mills	Annual
State	9		per \$1.00	Receipts
Alabam	a			
Alaska				
Arizona				\$ 900,000
Arkans				
Californ	nia			
Colorad	lo		1	1,500,000
Connec	ticut			
Delawa	re			
Dist. of	f Colu	mbia		
Florida			2	935,000
Georgia				
Hawaii				
Idaho			2	920,000
Illinois				
Indiana	ì		. 2	10,000,000
Iowa				
Kansas				
Kentuc	ky		3/10	600,000
Louisia				150,000
Maine			1.	577,000
Maryla	nd		3½	
Massac	husett	s		
Michiga	an			
Minnes	ota		. 1	1,775,000
Mississ	ippi			
Missou	ri			
Montar	1a			
Nebras	ska		3 1/5	1,700,000
Nevada	a		1	210,000
New H	ampsh	ire		
New Je	ersey		1	3,000,000
New M	Iexico		$4\frac{1}{2}$	1,700,000
New Y	ork			
North (
North :				
				2,800,000
Oklaho			1/4	500,000
Oregon				260,000
Pennsy				0=0.000
Rhode				270,000
South (756,000
South !				160,000
			45/100	900,000
Texas				
Utah			1/	100.000
Vermor	1t		½	130,000
Virgini				1,500,000
Washin	gton		1	1,060,000
West V	Virgini	.a	1/	1 700 000
Wiscon	sın		½	1,700,000
Wyomi	ng			***************************************

Total\$35,603,000

ciation. This form of tax would be different from the state road tax now in operation in the counties, in that it would be paid directly to the state treasurer and, in fact, would be similar to the school taxes, and taxes for the state general fund. It would be levied against all the property in the state, being, of course, state wide in every particular. If this tax should be adopted, the state road tax in each county should be abolished, and the state wide tax take its place. The first question coming to mind is, if the state wide tax is a proper plan, why was provision not made for it in the constitution?

The reason is obvious.

When the constitution of Utah was framed, the automobile was unknown and there was no thought of a state highway system administered by a state bureau or commission. Consequently, it was but natural that the constitution made provision for county authorities to levy funds for highway work, as at that time the county was the logical subdivision for highways. The speed of the growth of the automobile industry and with it the great modern highway movement, has been actually bewildering. Even when the state central body, the road commission, was created in 1909, no man could have foretold what changes would take place in motor transportation in a very few years. There is no record available as to number of automobiles in Utah in 1909, but at the end of 1912 there were 2600. It was not realized then that soon the highways would be so interrelated that it would be found necessary to create a great national system to

properly dovetail the state systems into a comprehensive, consistent whole so that every settlement in the land would be connected with its county seat, every county seat with its state capital, and every state capital with the national capital. The highway business in this state is just as much a state business as schools are, and could the framers of the constitution have known the conditions existing today, I believe all will agree that provisions would have been made for a state highway fund, as provisions were made for a school fund.

The next question is in what way is the state wide tax superior to the state road tax in each county? The state wide tax is superior for two reasons: first, because it will enable the state highway officials to apply funds where they are most needed without regard to county boundaries, thus removing the cause of the serious condition we are in today; and secondly, it will centralize control of our state highways in the state highof our state highways in the state highway body thus completing the job only partly done by the legislature of 1909. If a state highway commission is the proper plan, and the witnesses of 48 states and the national government declare it so to be, then their efficiency should not be hampered by the fact that the only foundation of their funds comes the only foundation of their funds comes from 29 subdivisions. In other words, if we are to have a state control for our highway business, let us divorce it from the restrictions placed upon it by the state road tax in each county.

Tabulation No. 7 shows the state valuation by counties for 1923; the state road tax levied in each county, and the

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amount of taxes realized. Tabulation No. 8 shows the total assessed valuation of the state for the years 1919. 1920, 1921. 1922 and 1923, together with the mean tax levy and the taxes realized. By adonting a state wide tax of 11/2 mills with an assessed valuation of 1923, \$975.000.00 would be raised as a state tax. This would pay the interest and sinking fund on the bonds of \$725,000 and have left over \$250,000 to be used as a construction fund.

The third question might be asked, will not this state wide tax open the door to give opportunity for state officials to increase the total taxation of the people? Under the existing law, the state road tax in each county could be raised to the maximum of 3 mills in every county. The state wide tax would only be 1% mills so that such a change as proposed would reduce the maximum legal property tax for highways from 3 mills to 1% mills. Also, from Tabulation No. 8 it is seen that for the past five years the actual mean tax levy for state roads for the entire state ranges from 1 to 16 mills giving an average for the five year period. 1919-1923, of 1.2 mills. This \$250.000 together with the million dollars received from motor vehicles if the present basis were retained, would furnish us ample funds for carrying out a progressive consistent program. A tvoical budget under such a plan would be as follows: For maintenance of state road

	system\$	500,000
F	or matching approx. \$900,000	
	annually federal aid	300.000
F	or construction work on state	
	roads not on federal highway	
	system	450,000

Total state funds......\$1.250.000 Federal aid 900,000

\$2,150,000

This vearly budget is very modest when compared to other states of the same assessed valuation to ours, and is about the amount of our yearly road bill of the last few years.

Such a plan as above outlined is quite closely in accord with the accepted financial principles. The motor vehicle would pay for all maintenance and in addition about \$500,000 for construction. The state wide general property tax would pay about \$1,000,000 annually, most of which would be applied to retire existing bonds. The distribution between general property and the motor vehicle would be approximately half and half, which is quite close to the proportion held to be correct by highway economists. This plan also would absolutely solve our present troubles and prevent any future occurrence of them as a state construction fund is permanently founded which can be placed in the state when most needed.

In conclusion, it has been pointed out that due to the lack of a state fund relying solely on the county taxing unit, the state road commission is powerless to improve the very important gateway roads and consequently, our state is los-ing large sums of tourist revenue an-nually, as well as gaining a very un-savory reputation, which will take years to overcome. To relieve this situation, the coming session of the legislature

Tabulation No. 7:

	1923 Taxes		
County	Assessed Valuation	Mills	1923 Tax
Beaver	\$ 6,430,807.00	1.0	\$ 6,382.97
Box Elder		0.5	18.698.44
Cache		0.2	6,304.15
Carbon		0.5	13,694.18
Daggett		1.0	538.73
Davis		1.0	19,072.78
Duchesne		1.0	5,235.96
Emery		3.0	23,148.51
Garfield	2,294,225.00	2.2	5,047.29
Grand	4,763,106.00	3.0	14,289.31
Iron	7,411,493.00	3.0	22,234.47
Juab	17,321,648.00	2.0	34,643.30
Kane	2,216,676.00	3.0	6,658.28
Millard	16,085,407.00	1.5	24,126.26
Morgan	5,366,439.00	2.5	13,364.83
Piute	2,698,897.00	0.5	1,349.44
Rich	3,063,338.00	1.0	2,857.28
Salt Lake		0.2	51,390.63
San Juan	3,496,379.00	3.0	7,489.51
Sanpete		1.0	15,361.57
Sevier	12,059,786.00	1.5	18,087.72
Summit	16,090,811.00	2.8	45,054.27
Tooele	17,553,223.00	0.5	8,776.24
Uintah	6,540,430.00	2.5	16,351.07
Utah	52,019,520.00	3.0	156,058.37
Wasatch		2.5	21,131.82
Washington	3,137,802.00	3.0	9,413.40
Wayne		1.5	1,736.69
Weber		1.04	60,734.42
Total	\$646,751,483.00		\$629,231.91



must create a state fund, and it has been shown that this fund could be obtained from a general appropriation or by increasing the gas tax. It has also been shown that our highway financial plan in this state is unsound, and leading authorities have been quoted to prove this. Finally a state wide property tay has been proposed which if placed in operation, will put Utah on a permanently sound financial basis as regards our highways.

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	Total assessed	Total state	
Year	valuation	road tax	Mean tax levy
1919	\$692,293,791.56	\$ 848,518.72	1.2 mills
1920	717,325,097.89	1,132,262.78	1.6 mills
1921	688,024,276.00	713,849.59	1.1 mills
1922	635,563,468.00	558,178.93	0.9 mills
1923	646,751,483.00	629,231.91	1.0 mills

Program for Road Chiefs

SACRAMENTO, Calif., Oct. 24.—The program for the tenth annual meeting of the American Association of State Highway Officials, which will be held at the Saint Francis hotel, San Francisco, November 17, 18, 19 and 20, has just come from the press of the state printing office and is being distributed to members of the association. The program, of 20 pages and cover, is beautifully printed and carries, besides the customary greetings to the delegates, two photographs of typical California highways, the complete scheduled program for the convention, and the list of officers and members of the organization, as well as the personnel of standing committees.

The convention will open Monday morning, November 17, with Fred R. White, president, in the chair. Following registration, Governor Friend W. Richardson of California and Mayor James Rolph, Jr., of San Francisco, will deliver addresses of welcome. President White will respond, and the annual report of W. C. Markham, executive secretary of the association, will be read. Howard C. Means, state highway engineer of Utah, will read the only paper at the morning session, on "Some Interesting Features in the Construction of the Wendover Cut-off in Utah."

A luncheon meeting of the executive committee will be held at noon and the afternoon will be given over to meetings of the standing committees at the Hotel Manx, these committees being: Plans and Surveys, Design, Specifications, Construction, Bridges and Structures, Tests and Investigations, Bituminous and Chemical Testing Problems, Maintenance, Administration, Traffic Control and Safety, Publications, Highway Transport, Cooperation with Contractors.

No entertainment for the evening has been scheduled.

Henry G. Shirley, chairman of the Virginia highway commission, will preside at the morning session on Tuesday, November 18. A. H. Hinkle, superiantendent of maintenance for the Indiana highway department, will read a paper on "How Shall Interstate Highways Be Named and Marked." Discussion will be led by W. G. Sloane of New Jersey. "Urgent Need for Uniform Traffic Laws and Public Safety Devices Throughout the United States" will be the subject of an address by Thomas H. MacDonald, chief of the bureau of public roads, who will follow.

In the afternoon session, L. A. Boulay, director of the department of highways and public works of Ohio, will preside. Frank T. Sheets, chief highway engineer of Illinois, will read a paper on "To What Extent May a State Economically Issue Bonds for Road Construction," the following discussion being led by Frank Page, chairman of the North "High-Carolina highway commission. "Highway Transportation Surveys" is the title of a programmed paper by J. Gordon McKay, chief of the division of highway transport and economics of the bureau of public roads, to be read at the same session, discussion being assigned to William H. Connell of Pennsylvania. James Allen, state highway engineer of Washington, will read a paper on "Problems of Mountain Road Construction," to be discussed by L. I. Hewes, deputy chief engineer of the bureau of public roads, and A. T. Goldbeck, chief of the division of tests of the bureau, will talk on "Some of the Recent Conclusions in Highway Research," to be discussed by Charles M. Upham of North Carolina.

H. B. Phillips, chairman of the Florida highway commission, will preside at the morning session on Wednesday, November 19. "The Value of the Practice of Weighing Concrete Aggregate for Pavement Construction" will be the subject of a paper by R. W. Crum, engineer in charge of materials and tests for Iowa, discussion to be led by F. C. Lang of Minnesota. Harvey M. Toy, chairman of the California highway

commission, will speak on "Needed State and National Legislation for the Public Land States," discussion to be led by Cyrus S. Avery of Oklahoma. "Convict Labor in Highway Construction" will be presented by State Highway Engineer Robert Morton of California, discussion to be led by O. T. Reedy of Colorado.

At the afternoon session, Frank F. Rogers of Michigan will preside and the reports of standing committees will be presented. A banquet for the delegates in the Colonial Room of the Saint Francis hotel, will occupy the evening.

cis hotel, will occupy the evening.

President White will preside again at the morning session on Thursday, November 20, when the balance of the reports of standing committees will be heard, to be followed by the regular business session, embracing the reports of the treasurer, executive, auditing and resolutions committees. Adjournment will follow the election of officers.—Western Highways Builder.

AUTUMN

By A. Henderson, Salt Lake City When Autumn blows her trumpet

When Autumn blows her trumpet I hear its echo far and wide, Among the lofty wooded hills, That rear their heads in pride.

And down from peak and turret Come elves with color pots, To paint the leaves and grasses, And glaze with icy mops.

And little brook that laughing plays Between its mossy banks, Becomes a still and lifeless thing With frost upon its flanks.

And little feathered songsters In flocks go hastening out; Bound southward for the winter, And the wild geese are en route.

And mingling with the north wind Comes swirling sleet and rain, And call of squirrel and chipmunk, Is silent once again.

And cuddled in leafy blankets
The elves have painted red
And brown and orange and yellow,
Autumn's guests lie snug in bed.



To be improved as soon as funds are available—a road near the south border.

Permanent roads are a good investment —not an expense

How the Motor Industry Set the Pace for Highway Building

The "horseless carriage" of yesterday is now being produced as the modern automobile at the rate of 4,000,000 a year. The total number of motor vehicles registered in the United States is over 16,000,000.

And automobiles built today are more than ever capable of economically serving both business and rec-

reation needs.

But there is an obstacle standing in the way of its

maximum service to owners.

For while the automobile industry made paved highways an economic necessity, the mileage of such roads is today years behind the requirements of modern traffic.

Happily motorists everywhere are boosting for

more and wider paved highways.

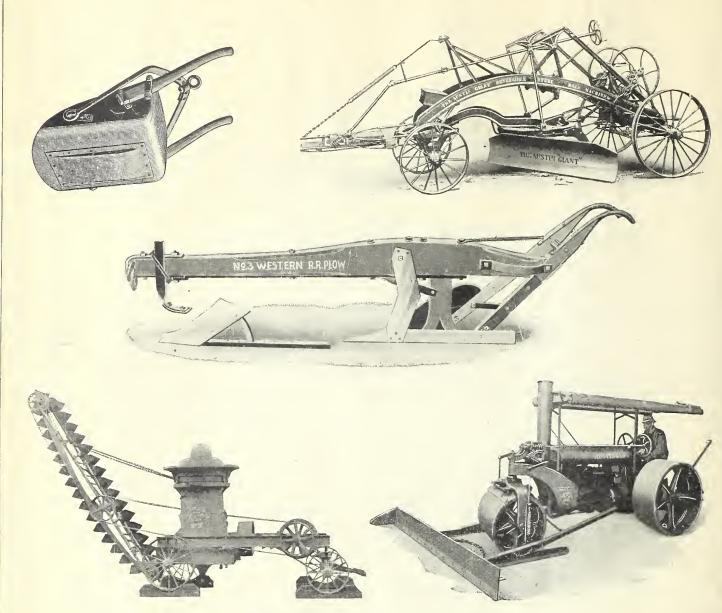
And extensive experience has taught them that Concrete Highways are one of the best all-around investments they can make—an investment that pays big dividends.

As one of our 16,000,000 motorists you know better than anyone else the need for more and wider Concrete Roads. Start now to help your local officials provide them.

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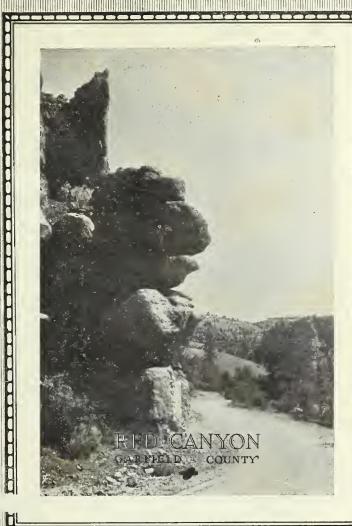
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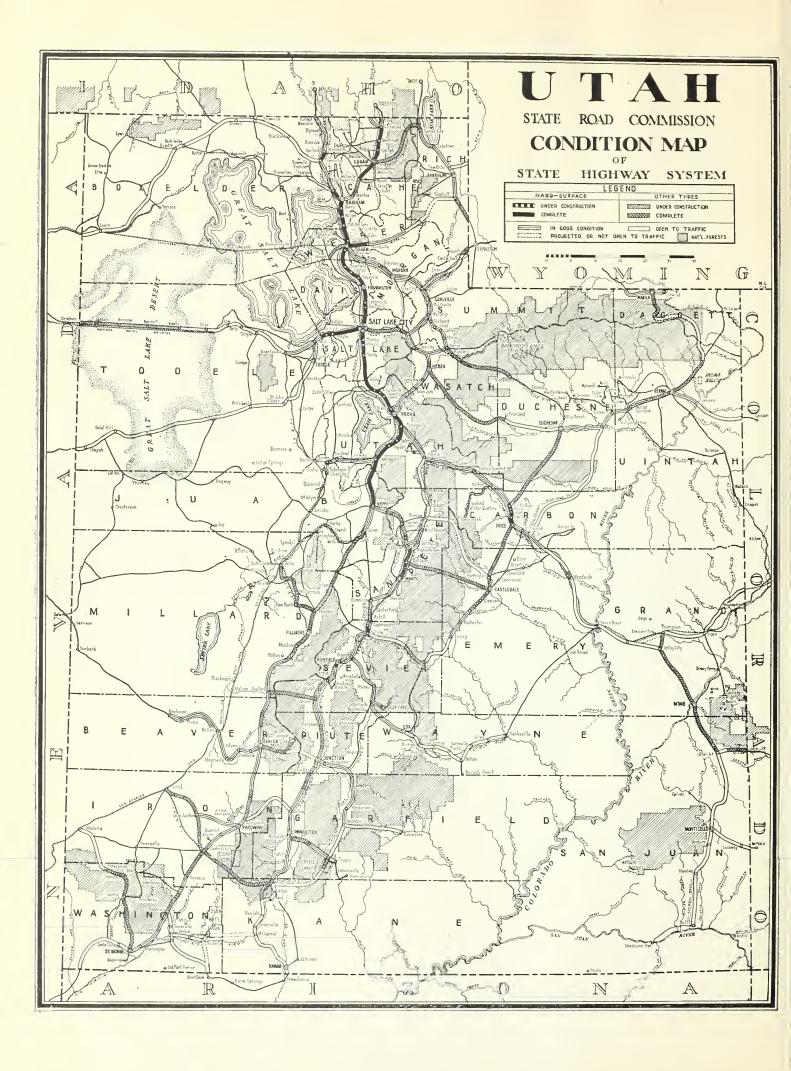




Vol. 2 MARCH

No. 5





Volume 2

MARCH, 1925

Number 5

Snow Removal On Utah Roads

By E. S. BORGQUIST, Assistant Engineer

The removal of snow from road surfaces is one of our newer problems. In the days of horse drawn vehicles, no one ever thought of snow removal except for pedestrians along sidewalks. Even in the early days of automobiles, highways were not cleared of snows because every man put his car in the garage for the winter. But with the extensive use of non-freezing solutions in the automobile radiators, and with the greater number of enclosed cars, busses, and school cars being built, the autoist uses his machine all winter. With this increased use has arisen the demand from the public that the main highways be kept open, and thus has been added to the state road officials the problem of snow removal.

During the present season a much more extensive program of snow removal has been accomplished than has ever been tried before. For the first time in the history of Utah, an open road has been maintained throughout the winter on a state road from the Idaho state line on the north to the Arizona line on the south.

During the winter of 1923-24 the Arrowhead Trail was kept open with the exception of the Summit crossing between Brigham and Wellsville, the new route through Sardine canyon being then under construction. Traffic was routed via Collinston and with the exception of a few days this detour was passable, Boxelder and Cache counties uniting in keeping the summit clear of snow.

The problem of keeping this north and south highway open has by no means been a small matter. The summit of Sardine Canyon in Cache county itself is nearly 7,000 feet in altitude and this year the snow has piled up to a depth of over three feet on the level which with numerous drifts in cuts has caused a condition that is exceeded in difficulties only in our higher and wilder mountain passes,

Logan, and in fact, Cache Valley as a whole, has usually, up to the last two winters, been "marooned" for several months so far as automobile traffic is concerned. With the construction of the newly completed Federal Aid project through Sardine Canyon and over the pass between Brigham and Wellsville, the state is now pledged to keep

an all-year road open into Cache Valley. That this is appreciated by the people in the northern part of the state and also by the Idaho autoists is apparent



Clearing the road to the Brigham-Wells-ville summit in Box Elder county.

from the large number of cars traveling over this road every day.

Mr. A. H. Powell, state road agent for Cache county, has done some splendid work in keeping the Sardine Canyon road open. He has used a ten-ton caterpillar tractor with a heavy snow plow in front of it to push the snow aside and wherever possible completely over the bank and down the mountain. This road has been kept open, except for short intervals, throughout the winter. Due to the continual drifting on the high ridges, it is often possible for the wind to block the road completely in the course of a couple of hours. This has course of a couple of hours. This has made it necessary to clear the road again and again during windy weather, has made it necessary to keep the caterpillar running continuously on a short stretch of the road exposed to such drifting. Mr. Powell has built a special snow plow with a blade five and one-half feet high in order to handle the deep drifts and in many places the snow on the sides of the road is banked six to eight feet high. The difficulties here have been increased with a temperature as low as 37 degerees below zero during the time the snow was being removed. The extreme depth of the snowdrifts formed and the numerous cuts which fill up with snow on this highway have really been more than the ordinary type of snow plow can handle successfully, and it is likely that some form of rotary plow must be provided for next season. The rotary plow has the advantage that it throws the snow com-pletely clear of the road whereas the common snowplow can merely push it to one side.

At the mouth of the canyon just east of Brigham City, a great deal of drifting has occurred making it necessary to locate a new road completely off the commonly traveled highway. The great difficulty encountered here in Box Elder county has been especially pronounced because we have not had equipment sufficiently heavy to handle the drifts.

Mr. K. C. Wright in charge of the snow removal in Box Elder, has had no equipment except a truck with a snow plow and a Hadfield-Penfield grader. Both of the machines are very efficient when the snow is not too deep, but when

the snow is drifted, both are found much too light.

Through Davis County the snow fall has been especially heavy being between two and three feet on the level. North from Bountiful as far as Centerville, a series of east winds filled the road with drifts 400 to 500 feet long and four to five feet deep. The street car track has been blocked completely and was opened only after a week's strenuous work with a railroad snow plow.

Here again the lack of proper equipment for heavy snow removal has been a serious handicap. It was only through the courtesy of Salt Lake County, who loaned a ten ton caterpillar with attached snow plow to Davis County, that the road between Salt Lake and Ogden has been kept open. This one machine owned by Salt Lake County was kept going night and day for 10 days and was used to clear the road from the Utah county line 20 miles south of Salt Lake to the Weber county line 30 miles north of Salt Lake a total distance of 50 miles.

At the Point of the Mountain at the Salt Lake-Utah county line, considerable drifting has occurred and it has been possible to keep the road open only by the diligent efforts of State Road Agents Jones and Wheeler of Utah and Salt Lake counties respectively. These officials have maintained a force of men and teams, snow plows and graders continuously on the job and have often worked day and night to keep the road open and to keep the traffic moving.

The southern end of the State also has been well taken care of by clearing the road up Salt Creek Canyon from Nephi into Sanpete County. Heavy snow has fallen at the head of Salt Creek and on the new Federal Aid project toward Moroni. Through Salt Creek a ten ton caterpillar dragging a large grader has done splendid work. The road is well opened up and traffic has been going through this canyon without delay. through this canyon without delay.

South from Moroni and as far as Richfield, the snow has been light, averaging about one foot deep but this has been well removed and the road is in fine shape. The Manti-Pigeon Hollow and the Gunnison and Salina pave-ments have been kept practically bare all winter.

Sevier County has kept the Sevier-Cove Fort road open all winter using a caterpillar and grader for the work. Much credit is also due Sevier County for keeping open the road through Salina canyon into Emery County, and over the Loa summit into Wayne county, as both these summits are nearly 8,000 feet high.

Also south of Panguitch, the road has been kept open over the rim of the Colorado river basin into the Kanab

country. On the Arrowhead trail the summit immediately north of Scipo in Millard county has been cleared and this highway kept open and clear through, with the result that California cars are coming through daily. A humorous incident, at least to the spectator, occurred at Spanish Fork a few days ago, where a heavily loaded Ford bearing a California license, was stuck in a heavy drift. The car was driven by a man dressed in white canvas shoes without



10-ton tractor with improvised plow bucking the snow in Sardine canyon.

rubbers or overshoes. He seemed to think Utah has a terrible climate.

Some objection has been raised in certain sections to snow removal on the ground that the road soon becomes bare and hauling by sleighs is thereby prevented. In this as in all other activities, it is never possible to do anything that will please everyone. Rather must we look at the matter from the broader viewpoint, that of doing the greatest good to the greatest number and looking at the small number of sleighs using the roads as compared with the number of automobiles, there can be no legitimate argument by sleigh drivers against snow removal.

Another important reason which the state road engineers have in mind is the protection of the subgrade in early spring. If snow is allowed to remain on a gravel road and moisture penetrate to and saturate the subgrade the road may go to pieces under the spring rush of traffic. This is particularly true on of traffic. This is particularly true on the mountain roads, where failure of the subgrade may block traffic for days after the winter's snows have disappeared and eventually result in much higher maintenance costs than snow removal would have necessitated.

The east and west interstate roads have not fared so well as the north and south roads. The Lincoln highway is closed on the Parley's Canyon summit and the Midland trail blocked with snow through the Price River canyon and at Soldier Summit. Due to the light traf-fic and the high expense necessary, it has been thought inadvisable to keep these roads open this year. Investigations have shown, however, that it may be possible to keep the Lincoln highway through Parley's open next year at a reasonable expense.

The highest summit of all which is being kept open this year, is the Indian Canyon summit into the Uintah Basin. Here the State, in cooperation with the U. S. Mail Service, maintains a station directly on the summit equipped with men and three large caterpillar tractors with snow plows to keep the mail route open at all times. This road has now been kept open for several years past. But with all the hard work that has

been done, the condition of the roads at present is far from satisfatcory. In most counties we have been badly handicapped by lack of equipment. The heavy snow this winter has shown us

that the only machine that will handle heavy snow is the ten-ton caterpillar with snow plow attached directly ahead of the machine. Few counties have these machines and have been forced to use lighter equipment such as trucks and graders which usually have proved very successful. The incident delay in getting the snow removed in many places has caused a layer of heavily packed snow to be formed directly on the pavement, which could not be removed later by snow plows, due to its packed condition. The few days rain and thaw that we had, turned this packed snow into slush and during the slushy period, chains on auto wheels cut ruts through the layer down to the pavement. A subsequent freezing period turned the slush and packed snow into ice in which condition it has remained for a long time.

The experience has taught those in charge of snow removal that snow must be removed while it is fresh and can be removed or serious conditions will arise later.

Snow removal is not a day-light job. The snow must be removed when it falls, day or night, and organization and equipment must be maintained to handle the work whenever necessary. During the past month two new snow plows were mounted on ten ton caterpillars and put to work in Utah and Box Elder Counties. Much remains to be done in providing more equipment, but with the seriousness of the problem fully appreciated by those in charge, it is safe to assume that we shall be well prepared in the near future for handling the work.

"Heavens, Judge, I couldn't stand that racket any longer so I threw them said a fair motorist in a Chicago court in explaining how she had skidded into a truck one rainy day without her chains. New cross chains to replace broken and worn links can be bought from your dealer in automobile accessories. Broken chains pound away at nerves as well as fenders and add to the strain of city driving.

A good man sets an example; a good road is likewise an example; and as we have too few good men, so have we too few good roads. Only when we find a travelable road going past every farm, through every village, and city, will it be time to cease talking good roads.—Texas Highway Bulletin.

To abandon the building of good roads would be comparable to a person starting to crawl after he has once started to walk.

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What It Cost to Maintain the State Roads In 1924

Tabulations recently compiled by the accounting division of the road commission show that the total amount expended in 1924 for the maintenance of 3034.16 miles of state highways was \$402,577.33. Supporting sheets prepared by the accountants show with a wealth of detail where the money went for every kind of maintenance operation. The cost of maintaining the several types of roads, classified as concrete, bituminous, gravel, graded earth and unimproved are shown separately and the cost of maintaining each type is sub-divided into twelve accounts, beginning with grading and following with a seg-regation for each of the various kinds of drainage structures in the roadway and ending with cost of surfacing repairs on surfaced roads. A separate account is also carried for snow removal.

The average cost per mile for maintenance of the different types of roads, with total mileage and total costs, is as

		Total	Cost per
Type	Miles	Cost	Mile
Concrete	174.13	\$51,122.47	293.59
Bituminous	35.63	13,956.58	
Gravel	512.36	70,247.28	137.11
Graded	2266.74	203,466.88	89.76
Unimproved	45.30	375.90	8.30

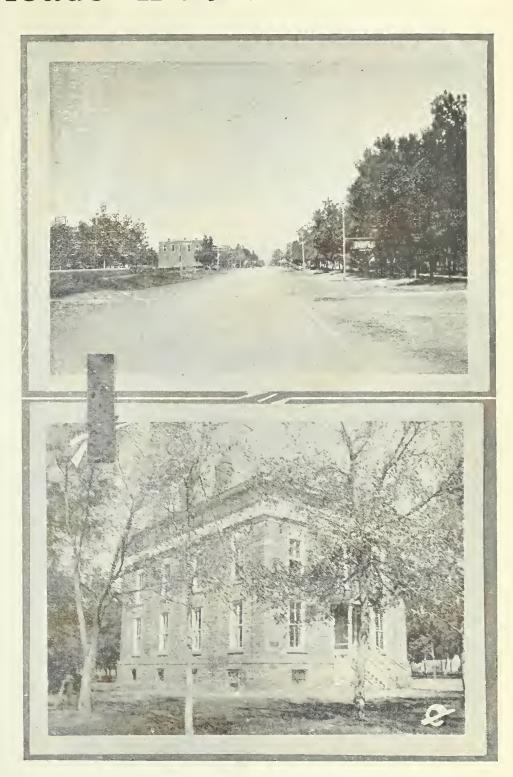
3034.16 \$339,169.11

The cost of maintenance and betterment administration, \$63,408.22 is not carried in the above tabulation. This account includes office supplies, new equipment, engineering and inspection and the salaries of the state's representatives, or road agents, one to each of the twenty-nine counties in the state.

Analysis of the above tabulation shows that the average cost per mile for maintenance of surfaced roads is, in round numbers, for concrete \$300, bituminous

\$400, gravel \$140.

In explanation of the high cost of maintenance of the paved roads, it should be stated that due to the use for the first time of revenue derived from the gasoline tax for highway repairs in 1924, the state has participated to a much greater extent than in any previous year in the supervision of maintenance. Much work was required on our hard surfaced mileage by the state engineers in cleaning up of right of way, building up of shoulders to original cross-section, and in improving drainage conditions, including the cleaning of culverts and digging additional drainage ditches. The item of grading alone was, for concrete roads \$151, and for bituminous roads \$205 per mile. For surfacting repairs only the costs for concrete were \$115; bituminous \$171, and gravel \$92 per mile. Due to geographical location and the much greater density of traffic, the item of snow removal is noticeably high, also, in the case of pavements as compared with the average for gravel surfaced roads throughout the state. Snow removal on concrete roads (Continued on Page 9)



ZION PARK HIGHWAY SURFACED THROUGH PAVANT VALLEY. Of the 208 miles on the Zion Park Highway, from the end of the pavement at Nephi to Anderson's Ranch in Washington county, 112 miles are included in 16 projects for gravel surfacing. Ten of these projects and 92 miles of road are completed. This highway into southern Utah traverses a series of fertile, populous valleys, the view above showing Fillmore, the metropolis of the Pavant valley. Back in the early 50's Fillmore was for a time the capital of Utah and the old state house is shown as it now stands in the portion of the public square devoted to the tourist camping grounds. Fillmore is on a completed project covering 23 miles of excellent gravel road which will be extended to 66 miles, Levan to Kanosh, upon the completion of two connecting projects now well advanced.

Twenty Years of Road Building Progress in the United States

By THOS. H. MacDONALD, Chief Engineer, U. S. Bureau of Public Roads

In the history of American road building there are two crucial periods which have influenced profoundly the subsequent development of the nation. Each marks a change in the attitude of the people toward highway transportation. In respect to the highway they are revolutionary changes—the first a change from busy, throbbing life to partial desuetude, the second a renaissance. In their bearing upon the history of the country they are evolutionary in character — representing an improvement in transportation in that there is involved a better adjustment of facilities to the needs of the people.

Viewed historically both are abrupt changes; both are introduced by the invention of a new kind of self-propelled vehicle. The first is ushered in by the steam locomotive. Almost, it is possible to name the day on which the change occurred-Independence Day, 1829. For, certainly there were in the events of that day all the potentialities which changed the course of settlement and upbuilding of this young country from a gradual, intensive growth outward from the eastern settlements—slowly, almost painfully, securing and cultivating the western possessions mile by mile to a swift conquest of the continent-wide empire through the distancedefying agency of the railroad. For on that Fourth of July, in the city of Baltimore the cornerstone of what has since come to be one our great railroad systems was laid by Charless Carroll of Carrollton, the last surviving signer of the Declaration of Independence. It was a momentous act, and that it should occur on the anniversary of the greatest day in American history is one of those inspiring coincidences which, in the history of nations, seem the evidence of a divine plan, so altogether fitting are they. The Fourth of July, 1829 was as truly an independence day as that first Fourth of July in '76 and who shall say that its consequences were not of equal moment to the American people. In 1776 they threw off the fetters of an unjust king; in 1829 they broke the bonds which restrained their economic development which, shuttling back and forth across this continent, were to weave the fabric of a mighty and homogeneous empire in the shortest time in history.

On that day when the country turned to the railroad the highway lost its significance as a major factor in the economic life of the nation. It rapidly fell back into place of comparative unimportance, and as the railroad grew, the highway sank to a lower and still lower estate. Its maintenance was neglected. At its lowest level, which was reached as the railroad approached the zenith of its development in the early nineties, it was no more than a neighborhood path. Those who laboriously followed its sinuous up and down course over "thank-

you-marms" and bowlders rarely encountered a stranger. They met their neighbors only with whom they joined in mutual commiseration for the hardships of the road. And the very roads that should have made communication easy became the barriers which confined to their homes the long winters through the hardy and hard-working farmers who had forgotten what a road might be.

Bicycle Awakens Good Road Interest. The first stirring of new life was felt in the late eighties and the early nineties. The bicycle was responsible. Its devotees sought pleasure roads. They organized clubs of wheelmen and the century run became the evidence of cycling prowess. And well it might. A hundred miles by highway was a greater distance than any man had traveled in the eastern half of the country for more than a half century. In response to their demand, reinforced by the early motorists, the vanguard of whose army arrived in the late nineties, first one, then another and another of the States began to make preparations for the improvement of the roads; and certain pioneer commonwealths, recognizing that the roads were destined no longer to remain the locally restricted arteries of travel they had long been, created State highway departments to administer the work of improvement on a scale commensurate with the longer range of

It is significant of the stagnant state of the road building art in the nineteenth century that when these State departments set out to improve the roads for the cyclists and the motorists they could build no other kind of road than that which John L. MacAdam had devised in the early years of the century. And not many years were required to convince them that kind of road would not do at all. The automobiles destroyed them as fast as they were built and passengers and countryside were coated with dust in the process.

With the increasing skill and ingenuity resulting from their few years of new experience the highway builders went to work to devise a type of road that would withstand the destructive action of the motor vehicles, and soon their efforts were rewarded in a measure by the discovery of crude methods of combining tars and asphalts with the stone roads. Popular resentment against expenditures of public funds for the accommodation of the few who in the early days were rich enough to own motor cars was overcome by the reduction in the price of the vehicles which rapidly brought them within the means of the many. As a result the road builders were permitted to improve the new discoveries in road building and go on beyond them to the development of other types. But whether the "good roads" movement could ever have developed into the solid industry it now is, had it not been for the development of the

motor truck is open to question. Certain it is that without the freight-carrying motor vehicle there would not long exist the strong economic justification of road improvement that there is now. And, as nearly as it is possible to determine it, this strongest of all arguments for road improvement first made its appearance just twenty years ago.

Real Highway Progress Began in 1904 In 1904 only 411 motor trucks were manufactured in the United States. In the same year the automobiles were numbered by the tens of thousands. In twenty years these main, impelling causes of better roads have grown to two and fourteen millions, respectively. In the beginning the motor car, like its predecessor the bicycle was a pleasure vehicle only—a doubtful pleasure perhaps. By perfection of its design the motorist has now been freed of the numerous troubles which beset the path of his forerunners, and the automobile is finding a place for itself as an instrument of business as well as pleasure. The recent traffic surveys made by the Bureau of Public Roads in a number of states show that fully one-third of passenger car mileage is in the interest of some business pursuit, and it is impossible not to foresee that this business usage will increase in importance. As for the motor truck—it has become a downright necessity. That both types of motor vehicle will become still more numerous, especially the motor trucks, is written large in the fundamental eco-

nomic facts which justify them.

For while the highway and the horse and wagon were rightly abandoned for the railroad in 1829 in order that our forefathers might quickly and thinly spread their culture over the wide, untamed spaces of their new land, the very efficiency of the railroad in performing its task has now created a condition of dense cultivation which demands a return to the improved highway and the improved highway vehicle as a short-haul supplement to the long-haul railroads. The country which has been developed extensively through the agen-cy of the railroads is now to be further developed intensively with the aid of the motor vehicle and the highway. We have built from the periphery inward. The broad axe alone is no longer sufficient for the hewing of our destiny. We are working in close quarters and we must resort to the fine-pointed chisel for the closer work. We have cultivated the center of the field to the limit; we must now begin to plow around the margins. Between the meshes of our railroad system there is a land which the railroad cannot economically serve. At the centers, where the railroads meet, great cities have sprung up, and their rapidly multiplying population makes transport demands on the immediate tributary area which the railroads, unaided, can not answer. The motor truck and the automobile with the improved

road offer the logical solution. It is these fundamental economic conditions which inspire confidence that the improvement of roads and the manufacture of motor vehicles must continue at an undiminished rate for years to come.

The Condition of Roads in 1904

But this was intended to be a retro-ect, not a prophecy. What of roadspect, not a prophecy. What of road-building progress in the last twenty years? Briefly the answer is that whatever progress is now evident has been made in that time. A survey of highway conditions made by the Office of Public Roads in 1904 showed that there were then in the United States only 38,622 miles of road classified as macadam or stone roads. Roads classified as gravel surface amounted to 108,233 miles; and there were only 6,807 miles of other types of surfaced roads, among which were included 2,541 miles in California surfaced with oil-mixed earth; nearly 200 miles of brick, mainly in Ohio, West Virginia and Iowa; 3,000 miles of sandclay in the Southern States; and 800 miles of shell roads in the coastal states. Therewere other miscellaneous types of improved roads, such as 145 miles of plank in Oregon; 13 miles of bituminous macadam and 3 miles of asphalt in Ohio; and the town of Tisbury, Mass., had 2 miles of road surfaced with a mixture of tar and sand. Of the total mileage of public roads then in existence, amounting to 2,151,570 miles, nearly two million miles were not improved with any kind of surfacing material and, by reason of the lack of necessary provisions for main-tenance, it is safe to say that this mileage and much of the surfaced mileage also was in a state of disrepair such as today is scarcely imaginable.

Prior to 1904 there were only 13 states which had created any kind of State agency for the supervision of road improvement, and the powers and duties of these departments were largely advisory in character. In the year 1904 two more states passed legislation creating State Highway departments, to be followed in 1905 by five others, one

of which was Michigan.

The total cash expenditure for road construction and maintenance by all States in 1904 was approximately \$59,-000,000 of which only \$2,500,000 or about 4 per cent was spent by or under the supervision of the thirteen state highway departments then in existence, and more than four-fifths of the total statecontrolled expenditure was made by the four states of Connecticut, Massachusetts, New Jersey and New York.

Owners of motor vehicles in a number of those states paid into the public treasuries a total of slightly more than \$33,-000; but most of the states made no charge for the privilege of using the roads, and most of those which did, failed to devote the money thus raised to road improvement ends. The principle of charging the motorist in accordance with the use of the road or in proportion to the road wear for which he is responsible had not yet emerged; and indeed there was yet no justification for it because the motorist's use of the rural highways was still so limited, and the service afforded by the small mileage of well kept road was so small as neither to require nor to warrant a special road charge on the basis of automobile own-

ership. The motorists, like all other citizens, paid for the repair and building of roads when they paid their poll and property taxes. If they preferred, they might choose in some States to work out their poll taxes, in lieu of cash payment, at the rate of a dollar a day. But all this is not to say that the users of the roads paid nothing at all for the special privilege of use. So far as the public treasuries were concerned, that was the fact; but the better roads in those days were maintained by turnpike companies, and one did not drive far without finding progress barred by a gate, where toll was demanded to pay the cost of the improvement-and no mean toll it was! Six of these turnpike companies, surviving until 1919 in Maryland and Virginia, levied tolls amounting to \$5.05 for an aggregate distance of 187.5 miles, which is equivalent to 2.7 cents a mile. No State has yet attempted to exact any such fee from those who use its roads. To do so by means of a gasoline tax it would be necessary to levy the tax at the rate of 36 cents a gallon!

Because of the lack of coordinating State agencies to give harmony to the efforts of the counties, and because of the meagreness of the means at the disposal of the local governing bodies there was scarcely anywhere a continuously improved section of highway long enough for an afternoon motor ride. Interstate travel was still a thing of the future and to drive by automobile across the continent from east to west or from north to south was unthinkable. where was there a plan for the harmonious development of a system of highways covering any considerable area. Maryland's system, the first to be planned for a whole State, was still a vision which had appeared only to her future governor, the far-seeing Austin L. Crothers, and a dream it was to remain for four more years. The adoption of Michigan's own system of trunk line roads was still nine years off, and the Federal-aid highway system was a conception so remote from the best thought of the day that more than a decade later it would still be entertained as

a fanciful notion only.

The Federal government's interest in road improvement was limited by the \$35,000 which, in 1904, it appropriated for the maintenance of the Office of Public Roads. The Office made the most of its pittance by using it to carry on experimental work; to train local road builders through the construction of object-lesson roads under the supervision of its own engineers, and to complete the highway engineering education of a small group of engineering school graduates each year to form the nucleus of the highway engineering profession in which, it constantly preached, should be lodged the responsibility for the technical direction of construction. From the time of its creation as the Office of Road Inquiry in 1893 it had unceasingly urged the organization of highway departments in all States.

Last Twenty Years a Period of Innovation.

Such was the situation in 1904. The country was then just beginning the work which has occupied it continuously for the twenty years since. The improved roads of that time had been sur-

faced for horse-drawn traffic and because of the early ravages of the automobile it is safe to say that scarcely a single mile, with the exception of the small mileage of brick, survived the ensuing five years. It is a reasonable presumption, therefore, that the now existing mileage of surfaced roads, conservatively estimated at 450,000 miles, is a product of the 20 years of effort since 1904. As for the higher types of construction, such as concrete, brick, bituminous concrete, sheet asphalt and bituminous macadam, not only have practically all of these roads been built in this 20-year period, but the very methods by which they are now con-structed are also the product of this period.

Indeed, if one would characterize the period as a whole, it must be as a period of innovation in all things pertaining to the highways. At the beginning of it, roads were built, maintained, used, administered as they had been for a hundred years before. In every particular, in which the roads of 1924 differ from those of 1824, the difference is a development of the last 20 years. By deliberate experimentation and incidental observation new types have been develoved to meet the new requirements of the motor vehicle; the design of these types has been constantly improved; machinery has been invented to cheapen cost and speed production; engineering control has become the rule rather than the exception; State highway departments have been created in every State and there has been a progressive transfer of more and more of the important road work to their supervision; the Federal government has become an active participant; the traffic has doubled and redoubled every three or four years and has changed in character from the wholly local and purely agricultural to a movement which is largely interurban and is limited neither by county nor State borders. And with the change in the character of the traffic there has grown up a distinctly modern develop-ment in the financing of the cost of highways, i. e., the users of the roads have been called upon to pay an increasing proportion of their cost.

State highway systems have designated in every state and the state highway departments, equipped at last with more than nominal authority are consistently and perseveringly applying all available funds toward the comple-tion of these main systems. To this policy the Federal Government has given its unqualified support by the creation of the Federal-aid highway system made up, in the main, of the more important links of the several state systems. And the result of this selective improvement of main systems is everywhere becoming apparent in the growing mileage of continuously improved road.

Annual Construction Now Four Times as Great as in 1904

Whereas the annual construction of surfaced roads up to 1904 and for several years after did not exceed 10,000 miles, practically all of which was improved with what are now called lowtype surfaces, there are surfaced each year more than 40,000 miles, much of which is improved with pavement of

(Continued on Page 7)



Published Monthly

OFFICIAL PUBLICATION OF THE STATE ROAD COMMISSION

Volume 2

MARCH, 1925

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H. V. RICHARDS. Editor

1925 CONSTRUCTION PROGRAM

Some changes relative to both mileage and costs have been made in the tentative program for 1925 as outlined in a previous issue, covering construction with federal aid. mileage it is proposed to surface with gravel has been increased from 141 to 147, and two separate bridge projects have been added. The reconstruction of a Sevier river bridge has been deferred to 1926 in place of which has been submitted the paving of 1.13 miles with concrete in Cedar City. With the uncompleted or "carryover" mileage in gravel surface projects under construction in 1924 the total of roads of this type it is expected to have under contract during 1925 will be 215 miles. Only two additional miles of "carryover" pavement remain to be completed, making this the leanest paving year the state has had since 1913, there having been completed during the intervening twelve years an average of 20.2 miles of pavement annually.

As an expeditious means, at a comparatively low cost, of making the roads passable in wet weather, gravel surfacing built of properly classified and compacted material continues to meet with increasing favor. The mileage surfaced with gravel of a high standard during the last four years is as

follows:

1921	 34.0
1922	 42.2
1923	 76.6
1924	128.2

These roads form an admirable base for a pavement when that is required, the alignment and grade of the gravel roads being considered permanent for any type of surfacing that may follow.

Estimate of Expenditure

The total cost of the above programmed mileage, including \$131,000 for separate bridge projects is \$1,849,500, of which the federal aid is \$1,325,600. From the federal appropriation available July 1st, 1924 (\$847,000) the amount included in projects placed under construction in 1924 is \$335,000, leaving \$512,000 available for proposed construction in 1925. \$90,000 additional is to be added to this figure as underruns of estimated costs on projects recently completed making the total federal aid \$602,000. Utah's allotment of federal aid for the fiscal year beginning July 1, 1925, is \$847,000. Since projects programmed with this fund cannot be placed under construction prior to July 1st, the federal aid allotted at the beginning of the state's fiscal year, Dec. 1, 1924, have been used so far as possible on projects on which the local funds to

match federal aid were available, and in line with this procedure the following projects in the 1925 program are under

construction at the date of writing:

The concrete arch over Ash creek, as part of the Black Ridge project; 2.8 miles of gravel surface between Anderson's and Toquerville with concrete bridge near Toquerville; from the end of the improved highway in Wild Cat canyon, Beaver county, to Cove Fort, 8 miles gravel; a half mile project to reduce the grade on the Manderfield hill near Beaver; 5.5 miles between Richfield and Elsinore. These projects absorb \$153,-000 federal aid. Other gravel surface projects financed as to county funds and on which contracts will be let as soon as plans are approved are: Seven miles from La Sal Junction in San Juan county (advertised); seventeen miles between Salina and Richfield; nine miles between Bear River City and Tremonton, together with the concrete bridge over Bear river; and nine miles between Myton and Antelope in Duchesne county. The total federal liability on these projects is estimated at \$405,000, which added to those now under contract, leaves a balance of \$44,000 unallotted, an amount insufficient to finance the construction of any other projects for which local funds have been made available.

Projects for which the county's share of costs have been made available or which it is assumed will be paid into the state treasury prior to July 1, permitting construction to begin on that date are: Gravel surfacing-Parowan-Winn Hollow, 9.6 miles; Roosevelt-Myton, 10 miles; Orem to Bridal Veil Falls in Provo canyon, 6.3 miles; four miles in Weber canyon divided between Morgan, Weber and Davis counties; 7 miles between Kimballs and Hailstone, in Wasatch county, and the

paving in Cedar City.

The following gravel surface projects are tentatively programmed with construction dependent upon state funds: tension of the improved highway in Echo canyon from Emory to Castle Rock, 8.7 miles; and of the Wendover road from Knolls to Timpie, 361 miles; and 26 bridges in three projects

in Emery and Grand counties.

Legislative action may have, by the time of publication of this issue, provided some means for financing the above projects. The state highway fund is now credited with \$450,-000 as the net proceeds of the revenue derived from the motor vehicle and gasoline tax for 1924. Priority charges against these sources of revenue, under prevailing statutes, are the amount set aside annually for the retirement of state road bonds, the interest payments on these bonds and payment of the costs of administration of the motor vehicle department. The remainder above referred to, all of which is now available for use on the roads, has been budgeted as follows: maintenance \$230,000, contingent reserve \$60,000 and \$160,000 as a state fund to be used in the financing of federal aid projects and other construction providing legislation permits the use of the highway fund for construction.

In addition to the five projects in the 1925 program for which state funds will be required, before construction can proceed there is an extensive mileage leading from our borders to the more populous portions of the state, roads which form a part of transcontinental highways, and for which funds are lacking to match federal aid. There are but 72 miles of road classed as interstate connections in the projects listed, or tentatively included in the 1925 program, while there is a total of 465 miles of such roads to be improved through the outlying, low-valuation counties before the state can expect to derive the full benefit from the heavy expenditures that have been made and are now being made in the central portions of the state and particularly in the regions of scenic These interstate roads and the estimated cost of iminterest. proving them to required standards are as follows:

Wyoming line to Emory, in Summit county, 19 miles, \$247,000; Echo to Gogorza, Summit county, 28 miles, \$280,000; in Weber canyon from Echo to Devil's Gate, 26 miles, \$364,000; from the Colorado line through Vernal and Myton to Duchesne, 88 miles, \$704,000; Lockerby to La Sal Junction, 53 miles, \$530,000; Westwater via Green River to Price, 142 miles, \$1,136,000; Knolls to Mills in Tooele county, 58 miles, \$580,000; Arizona line to Anderson's ranch, 51 miles, \$765,000.

All of these roads, without exception, form important interstate connections, and all form a part of the federal aid highway system. The total cost of improving the above routes is \$4,600,000. With the government's share at the rate of 74% of the total costs the federal participation will amount to \$3,400,000, or, allowing \$500,000 from the annual federal appropriation for Utah, \$850,000, a seven-year program will complete all of this mileage if state funds in the amount of \$160,000 annually can be had to secure allotment of federal aid.

1925 Construction Program

F.A.P. No.	County	Location	Туре	Length	Total Cost	Federal Aid
7-A	San Juan	La Sal Junction-Big Wash	Gravel	6.8 Mi.	\$ 79,660.18	\$ 58,948.53
51-B	Tooele	Timpie-Knolls	Gravel	36.1 Mi.	264,000.00	195,360.00
55-A-2	Washington	Ash Creek Crossing	Concrete Arch	200 Ft.	28,953.66	21,424.97
60-B	Summit	Emory-Castle Rock	Gravel	8.7 Mi.	96,000.00	71,040.00
61-ABC	Sevier	Salina-Richfield	Gravel	17.4 Mi.	187,860.59	139,016.83
62-A	Morgan	Mountain Green-Weber	Gravel	1.6 Mi.	35,000.00	25,900.00
62-B	Weber	Morgan-Devil's Gate	Gravel	.4 Mi.	9,000.00	6,660.00
62-C	Davis	Devil's Gate-Weber	Gravel	1.9 Mi.	36,000.00	26,640.00
33-A-2	Box Elder	Bear River Bridge	Concrete T-Beam	267 Ft.	51,163.17	25,000.00
63-B	Box Elder	Bear River City-Tremonton	Gravel	9.0 Mi.	134,000.00	99,160.00
65-B	Utah	Bridal Veil Falls-Orem	Gravel	6.3 Mi.	165,000.00	122,100.00
66-A	Iron	Parowan-Winn Hollow	Gravel	9.6 Mi.	124,188.15	91,899.23
68-A	Millard	Dog Valley-Cove Fort	Gravel	6.5 Mi.	60,000.00	44,400.00
74-A	Emery	Carbon County-Woodside	Timber Bridges	10—265 Ft.	10,000.00	7,400.00
75-A	Emery	Woodside-Green River	Timber Bridges	10—250 Ft.	10,000.00	7,400.00
77-A	Sevier	Richfield-Elsinore	Gravei	5.5 Mi.	57,506.28	42,554.65
78	Iron	Cedar City	Concrete	1.13 Mi.	75,000.00	25,300.00
81-A-1	Washington	Anderson's-Toquerville	Gravel	2.8 Mi.	34,886.04	25,815.67
81-A-2	Washington	Toquerville Bridge	Concrete	150 Ft.	15,363.10	11,368.69
82-A	Beaver	Manderfield Hill	Gravel	0.5 Mi.	8,852.60	6,550.00
93-A	Wasatch	Kimballs-Hailstone	Gravel	7.0 Mi.	60,000.00	44,400,00
94-AC	Duchesne	Roosevelt-Antelope	Gravel	19.3 Mi.	230,000.00	170,200.00
98-A	Beaver	Wild Cat-Millard County	Gravel	5.8 Mi.	40,456.08	29,937.50
98-B	Millard	Beaver County-Cove Fort	Gravel	2.1 Mi.	21,151.10	15,651.81
100-A	Grand	Green River-Floy	Timber Bridges	6—420 Ft.	15,500.00	11,470.00
		Totals	.Gravel	147.3 Mi.	\$1,643,560,43	\$1,216,235.14
			Concrete	1.13 Mi.	75,000.00	25,300.00
			Concrete Bridges	617 Ft.	95,479.93	57,793.66
			Timber Bridges	935 Ft.	35,500.00	26,270.00
			Totals		\$1,849,540.36	\$1,325,598.80

Twenty Years of Road Building in United States

(Continued from Page 5)

high type. The annual cash expenditure has increased from \$59,000,000 in 1904 to almost a billion dollars in 1924; and the percentage of the expenditure made under the supervision of the State higher departments has grown from 4 per cent in 1904 to more than 40 percent at the present time.

The development of a sense of responsibility for the maintenance of the highways is another of the concomitants of state highway department control, reinforced by the insistence of the Federal government since the federal-aid road act became a law in 1916. There is no doubt that the urgent need of increased improved mileage in the earlier years of our two decades of progress, and a too optimistic confidence in the durability of the roads built, were responsible for the failure to reserve a sufficient portion of the available revenue for maintenance purposes. What part of the investment made in these years was dissipated as a result, no one can say, but it was probably considerable. So far as the State highway departments have influence this serious defect of administration has now been practically eliminated, and marked im-provement in maintenance is noticeable even on the county roads.

The best evidence of the improvement that has been made in the state of the roads is found in the large numbers of vehicles which now are to be found using them. From my office window I

looked down upon the entrance of one of Washington's famous hotels. The automobiles that arrive at that entrance bear the license tags of every State in the Union. I have counted as many as twenty different State licenses in the course of an afternoon ride on Maryland roads. The survey of highway transportation in Connecticut, made by the Bureau of Public Roads showed a net tonnage of commodities transported over the Connecticut highway system amounting to over a million tons in three months, and a portion of this tonnage was moved by highway more than 100 miles. Motor bus lines operate over practically every main road and provide a service as regular as that offered by the railroads. The daily delivery of milk to our large cities, formerly a service rendered solely by the railroads is rapidly being taken over by the highways. Already several cities receive practically the whole of their daily supply in that way. A similar change has taken place in the transportation of livestock from the areas immediately surrounding the stockyards; and the supplies of fresh vegetables and garden truck required daily by city consumers are now also delivered by truck instead of by railroad. The railroads, themselves, realizing the advantage of highway transportation as a supplementary service are resorting to the motor truck for the transportation of the short-haul, package freight which has for some time been handled at a loss over the rails.

One might go on enumerating instances of new and more extensive usage of the highways as evidence of the progress that has been made. The daily truck delivery service from the country

to the city has been mentioned, but the similar service in the opposite direction, delivering bread, ice cream, fresh meat, canned goods, dry goods and other commodities originating in the city is of practically equal importance.

None of these things was possible twenty years ago. That they are now a part of our daily experience is the result largely of several ideas developed during the period since 1904, among which I would enumerate the following as the most important:

- 1. The classification of highways as interstate, state and local roads and assumption of responsibility for each class by the appropriate governmental body.
- 2. The creation of state highway departments to administer the construction and maintenance of the state roads.
- 3. The provision of adequate funds for construction and maintenance of state roads, and the control of such funds by the state highway department.

The assessment of the cost of road improvement upon the various classes benefited in proportion to the benefits received.

- 5. Adjustment of the type of surface construction to the traffic requirements.
- 6. Continuous maintenance of all roads constructed.

These are the important principles which have been responsible for the progress that has been made in the last 20 years. I know of no better chart to guide our future progress. Wherever they have not been applied in the past it will be the part of wisdom to apply them in the future, for the accumulated experience of 20 years is back of them.

Proposed Route Through Manti Forest To Parks of Southern Utah

By H. S. KERR, Asst. Chief Engineer

Highway improvement in the region containing Zion National Park, Cedar Breaks and Bryce Canyon has been prosecuted with vigor during the past two years. With the program outlined for 1925 and 1926 the development of the highways leading to and connecting these scenic attractions it is the anticipation that the tourist travel will grow to high proportions, exceeding by many thousands annually the number now visiting this region. A considerable percentage of the tourist travel to South-

ern Utah, including both that of local origin and from point outside the state, is by automobile from Salt Lake City and it is desired to call attention to the possibility of an alternate route via Wasatch Plateau in the Manti National Forest. This route would be particularly pleasing in summer and early fall; unique in many ways; make accessible a beautiful region in Sanpete, Sevier and Wayne counties and in addition be of great value in the development of the Manti Forest. The new highway would take advantage of many miles of road now in use and the gaps now existing altho in a region approaching 11,000 feet elevation can be made a good mountain road with very little expenditure.

Forest road to Fremont). This would be a circuitous route between Meadow Gulch and Fish Lake but could be used until the traffic justified a more direct line.

From Soldier Summit to Meadow Gulch the distance would be approximately 85 miles, about half of which would be along existing roads, that would require an average expenditure of about \$500 per mile to make the same fairly good and safe, though unsurfaced roads. \$750.00 per mile would approximately cover the cost of the remaining half to same standards. The entire route would be at a high elevation, averaging about 8,000 feet, and through an attractive mountain region.

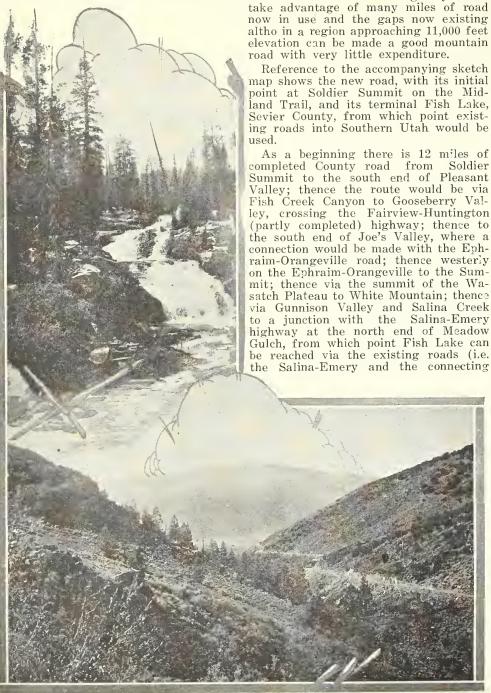
From the summit of the Ephraim-Orangeville highway to White Mountain, the southern terminal of the Wasatch Plateau, the altitude for a distance of twenty miles ranges between 10,000 and 11,000 feet. Over this section the proposed route follows an old Indian trail. Whether for peace or war it afforded its dusky travellers a wonderful vantage ground from which to view a vast expanse of plain and valley terminating both east and west in other distant, snowy summits.

In connection with coal investigations the writer has had occasion to go over this route a number of times. Similar work has caused him to travel extensively over the western portions of both North and South America but from no other mountain summit he has ever visited is the view so beautiful and sublime as that from the Wasatch Plateau.

Not only would this road afford a distinct addition to the major scenic attractions of Utah but its building would be otherwise of great local value in the development of the Manti forest both in affording easy access to the great herds of sheep and cattle which graze on its slopes during the summer months and also from the standpoint of fire protection. There is no other national forest in the United States which equals the Manti in wealth of vegetation and grazing value over the same area and while airplanes have been found of use in some forests for fire protection they would be limited if any, value with this road in use, which might perhaps be aptly termed the Wasatch Skyway.

Although the road is on the ridge and well above the timber line over the 20 mile stretch good camping grounds, most excellent water, meadows and forests are within easy reach t othe right or left. The trail winds among banks of perpetual snow feeders of fine streams which, descending irrigate the fertile valleys below and which will offer the mountain tourist most excellent trout fishing. Over the entire proposed road good hunting in season abounds.

For those who would investigate the proposed route it can be very easily accomplished by outfitting at Manti, Ephraim, or Castle Dale, and without



Above—Scene in Manti Forest. Below—A part of the nine-mile dugway on completed forest road to Fish lake.

MANTI FOREST HIGHWAY BUILT PROPOSED SANTARUM THISTILL PROPOSED THE BOOK TO THISTILL A HE COLFOR WAS FOR. COLESTER MANTI COLESTER MANT

oubt the statements made here will be equiesced in after such investigation and surprise expressed that a very attactive region has not been called to be general attention long ere this.

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SALT LAKE CITY

Cost of Maintaining State Roads in 1924

(Continued from Page 3)

ran as high as \$80 per mile with an average cost of \$7.49 for all concrete. The highest cost for snow removal on gravel roads was \$30 per mile with an average of \$2.36.

Improved methods were introduced in making surface repairs on concrete roads, care being taken to prevent the asphalt and sand used for filler from forming irregularities in the pavement surface especially at the expansion joints. Attention to detail with the end in view of increasing the smoothness of riding of all types of roads is stressed in the instructions to foremen in charge of maintenance. The point is made in these instructions that any repairs which result in irregularities of surface are worse than useless and should not be attempted.

State's Participation in Costs for 1925

The receipts from the gasoline tax and motor vehicles license fees, available for use by the state road commission in assisting the counties to maintain the state roads, was \$149,490 for 1924 or 37% of the total expenditure. In the distribution of this fund among the several counties, it was decided by the commission that the most feasible and equitable method was to classify the roads as to traffic, type, and other conditions; fix the lowest mileage cost consistent with

proper maintenance and then budget for each county an amount equal to onehalf the sum so ascertained.

For 1925 the same method of distribution of the state fund is followed with \$230,000 budgeted or 56% of the total estimated costs, \$411,000, which figure includes costs of administration.

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Status of Federal Aid Projects

By F. S. THOMPSON, Chief Draftsman

Projects Under Construction or Contract February 28, 1925

County	Name	Type				Estimate Cost
Commit	Thomason Moch Pridges		200 ft	100	Clark & Cropps	\$ 25,262.
		Creval				93,686.6
						35,536.
						299,315.4
						140,727.
						28,953.
						141,000.
						153,288.
						80,385.
						17,763.
						52,862.
						85,823.
Uintah						45,628.
Sanpete						55,782.
Sevier						57,506.
Washington	Anderson's-Toquerville	Gravel				34,886.
Washington	Toquerville Bridge	Concrete	150 f	t. 0		15,363.
Beaver	Manderfield Hill	Gravel	0.5	0		8,852.
Beaver	Wild Cat-Millard Co.	Gravel	5.8	0	Inland Engineering Co.	40,456.
Millard	Beaver CoCove Fort	Gravel	2.1	0	Inland Engineering Co.	21,151.
		7				
	Grand Juab Piute Tooele Washington Washington Davis Summit Box Elder Box Elder Utah Millard Uintah Sanpete Sevier Washington Washington Beaver Beaver	Grand Juab Juab Chicken Creek, Millard Co. Piute Junction-Red Bridge Tooele Washington Davis Summit Box Elder Utah Willard Uintah Sanpete Sevier Washington Washington Davis Ash Creek-Iron Co. Ash Creek Bridge Layton-Clearfield Echo-Emory Malad River Bridge Wasatch-Bridal Veil Falls Millard Uintah Uintah River Bridge Fairview-Mt. Pleasant Richfield-Elsinore Anderson's-Toquerville Washington Washington Beaver Manderfield Hill Wild Cat-Millard Co.	Grand Thompson-Moab Bridges Juab Chicken Creek, Millard Co. Gravel Piute Junction-Red Bridge Gravel Tooele Knolls-Wendover Gravel Washington Ash Creek-Iron Co. Gravel Washington Ash Creek Bridge Con.Arch Davis Layton-Clearfield Resurf. Summit Echo-Emory Gravel Box Elder Chase-Bear River City Gravel Box Elder Malad River Bridge Concrete Utah Wasatch-Bridal Veil Falls Gravel Millard Scipio-Holden Gravel Uintah Uintah River Bridge Steel Sanpete Fairview-Mt. Pleasant Gravel Sevier Richfield-Elsinore Gravel Washington Anderson's-Toquerville Gravel Washington Holden Gravel Washington Anderson's-Toquerville Gravel Washington Holden Gravel Washington Holden Gravel Washington Anderson's-Toquerville Gravel Washington Holden Gravel Washington Holden Gravel Washington Gravel Gravel Washington Holden Gravel Washington Gravel Gravel Washington Holden Gravel Washington Holden Gravel Washington Gravel Gravel Washington Holden Gravel Washington Gravel Gravel Washington Holden Gravel Washington Gravel Gravel Washington Gravel Gravel Washington Holden Gravel Washington Gravel Gravel	Grand Thompson-Moab Bridges 300 ft. Juab Chicken Creek, Millard Co. Gravel 13.87 Piute Junction-Red Bridge Gravel 5.28 Tooele Knolls-Wendover Gravel 41.40 Washington Ash Creek-Iron Co. Gravel 8.65 Washington Ash Creek Bridge Con.Arch 210 ft. Davis Layton-Clearfield Resurf. 4.11 Summit Echo-Emory Gravel 11.0 Box Elder Chase-Bear River City Gravel 5.09 Box Elder Malad River Bridge Concrete 100 ft. Utah Wasatch-Bridal Veil Falls Gravel 3.37 Millard Scipio-Holden Gravel 12.04 Uintah Uintah River Bridge Steel 120 ft. Sanpete Fairview-Mt. Pleasant Gravel 4.98 Sevier Richfield-Elsinore Gravel 5.53 Washington Anderson's-Toquerville Gravel 2.88 Washington Toquerville Bridge Concrete 150 f Beaver Manderfield Hill Gravel 0.5 Beaver Wild Cat-Millard Co. Gravel 5.8	Grand Thompson-Moab Bridges 300 ft. 100 Juab Chicken Creek, Millard Co. Gravel 13.87 90 Piute Junction-Red Bridge Gravel 5.28 90 Tooele Knolls-Wendover Gravel 41.40 85 Washington Ash Creek-Iron Co. Gravel 8.65 56 Washington Ash Creek Bridge Con.Arch 210 ft. 0 Davis Layton-Clearfield Resurf. 4.11 50 Summit Echo-Emory Gravel 11.0 28 Box Elder Chase-Bear River City Gravel 5.09 90 Box Elder Malad River Bridge Concrete 100 ft. 0 Utah Wasatch-Bridal Veil Falls Gravel 3.37 35 Millard Scipio-Holden Gravel 12.04 25 Uintah Uintah River Bridge Steel 120 ft. 90 Sanpete Fairview-Mt. Pleasant Gravel 4.98 55 Sevier Richfield-Elsinore Gravel 2.83 0 Washington Anderson's-Toquerville Gravel 2.83 0 Washington Toquerville Bridge Concrete 150 ft. 0 Beaver Manderfield Hill Gravel 0.5 0 Beaver Wild Cat-Millard Co. Gravel 5.8	Grand Thompson-Moab Bridges Juab Chicken Creek, Millard Co. Piute Junction-Red Bridge Gravel 5.28 90 Clark Construction Co. Tooele Knolls-Wendover Gravel 41.40 85 Kroft, Bundy, Zimmer & Lamus Washington Ash Creek-Iron Co. Gravel 8.65 56 Paxton, Dorrity & Black Washington Ash Creek Bridge Con.Arch 210 ft. 0 Whitney & Reynolds Davis Layton-Clearfield Resurf. 4.11 50 Ryberg Bros. Summit Echo-Emory Gravel 11.0 28 Wasatch Grading Co. Box Elder Chase-Bear River City Gravel 5.09 90 Olaf Nelson Box Elder Malad River Bridge Concrete 100 ft. 0 Jas. J. Burke & Co. Utah Wasatch-Bridal Veil Falls Gravel 3.37 35 Inland Engr. & Const. Co. Millard Scipio-Holden Gravel 12.04 25 Hawley, Anderson & Hinckley Uintah River Bridge Steel 120 ft. 90 C. F. Dinsmore & Co. Sanpete Fairview-Mt. Pleasant Gravel 4.98 55 Gray & Murdock Sevier Richfield-Elsinore Gravel 5.53 0 A. G. Young & Co. Washington Anderson's-Toquerville Gravel 2.83 0 Raleigh & Higbee Washington Toquerville Bridge Gravel 5.5 0 Inland Engineering Co. Beaver Manderfield Hill Gravel 5.5 0 Inland Engineering Co.

		Projects Recently Advertised			. 1
No.	County	Name	Type		gth
7-A	San Juan	LaSal Junction-Big Wash	Gravel	5.06	Mi.
	Projects f	or Which Plans Have Been App	proved		
61-A	Sevier	Salina-Aurora	Gravel	4.12	
61-B	Sevier	Aurora-Sigurd	Gravel	5.93	
61-C	Sevier	Sigurd-Reihfield	Gravel	7.39	IVII.
	Projects f	for Which Plans Have Been Subi			
63-A-2	Box Elder	Bear River Bridge	Concrete		Ft.
68-A	Millard	Cove Fort-Dog Valley	Gravel	6.0	Mi.
	Plar	is in the Course of Preparation			
51-B	Tooele	Timie-Knolls	Gravel	36.1	Mi.
63-B	Box Elder	Bear River City-Tremonton	Gravel	9.0	Mi.
65-B 66-A	Utah Iron	Bridal Veil Falls-Orem Parowan-Winn Hollow	Gravel Gravel	$6.3 \\ 9.6$	Mi. Mi.
94-A	Duchesne	Myton-Antelope	Gravel	9.2	Mi.
94-B	Duchesne	Antelope-Duchesne	Gravel	10.3	Mi.
94-C	Duchesne	Myton-Roosevelt	Gravel	9.5	Mi.
		Surveys Completed			
19-D	Piute	Red Bridge-Garfield County	Gravel	3.5	Mi
64-A	Piute	Marysvale-Sevier	Gravel	4.9	Mi.
68-B	Millard	Dog Valley-Kanosh	Gravel	14.0	Mi.
73-A	Utah	Springville-Soldier Summit	Gravel	30.0	Mi.
		Proposed New Work			
60-B	Summit	Emory-Castle Rock	Gravel	8.7	Mi.
62-A	Morgan	Mountain Green-Weber Co.	Gravel	1.6	Mi.
62-B	Weber	Morgan-Devil's Gate	Gravel Gravel	.4 1.9	Mi. Mi.
62-C 74-A	Davis Emery	Devil's Gate-Weber Co. Carbon CoWoodside	Timber Bridge		Ft.
75-A	Emery	Woodside-Green River	Timber Bridge		
78	Iron	Cedar City	Paving	1.13	
86	Tooele	Salt Lake CoTimpie	Gravel	28.0	Mi.
87	Tooele	Mills-Tooele	Gravel		Mi.
100-A	Grand	Green River-Floy	Timber Bridge	es 420	Ft.

San Juan County Work Let Bids were received February 20th on the La Sal Junction-Big Wash federal aid project. The work will be a five-mile extension of the 60 miles of completed federal highway between Thompsons, in Grand county, to La Sal Junction, in San Juan county. The bid of

Butler & O'Berto, of Grand Junction. Colorado, was the lowest of the seven tenders received. Based on their unit prices the total cost of the work will be \$52,948.08, this figure including the materials to be furnished by the state and a ten per cent allowance for engineering and contingencies. The work will in-

clude the grading and surfacing with gravel of 5.06 miles of road and th building of one 56-foot and one 70-foo span bridges together with several mis cellaneous structures. The completion of this project will materially reduce the cost of haul to and from Monticelle the stretches of deep sand on this por tion of the road necessitating lighte loads than elsewhere on the route.

Contracts Awarded in Washington

Bids were received February 13 fo the construction of a 210-foot concret arch bridge over Ash creek in Wash ington county. The bid of Whitney & Reynolds of Springville was the lowes of the ten bids received. The total cos of the structure, including materials an engineering as based on the low bid wi be \$28,953.66. The open spandrel are has a clear length of 130 feet whic will make it, when constructed by fa the longest concrete arch in the state Contract was awarded February 20 an work will commence at once, the tim limit on this structure being set at Jun 1. The bridge is a part of F. A. P. No



Black Ridge project in Washington county, F. A. P. 55A.



tilding state road on Route No. 6, Victy Highway, via Vernal and Duchesne. ews are on Project 10-B, immediately est of Vernal, five miles of gravel surfacing built by A. G. Young & Co.

the "Black Ridge" project on which a road contract covering 8.56 miles of ading and gravel surfacing is now 56 recent complete. The new road and and enew crossing of Ash creek which all be effected by the concrete arch added will eliminate the dangerous Ash beek dugway on the old road as well the lower crossing of Ash creek at a junction of projects 55 and 12, the ter extending from the lower bridge Anderson's ranch, the junction point Zion park.

Other contracts recently awarded in Washington county are for the construction of 2.83 miles of gravel surfaced road between Anderson's ranch and Toquerville with the construction of a concrete bridge over Ash creek near Toquerville.

Roosevelt-Duchesne Surveys Completed
The three sections of federal aid project 94, in Duchesne county, on which surveys have been in progress for the past few months, covering about 30 miles of road, are now in the office for review. It will be necessary to estimate the costs of two alternate lines between Myton and Roosevelt before an approval can be reached on the location of section C. Plans are now well under way on section A, 9.2 miles, between Antelope and Myton, and section B, 10.3 miles, between Duchesne and Antelope. The alternate routes referred to on section C are what is known as the "Ioka" line, about 10 miles in length, and the Sphinx Butte line, 9½ miles. At the request of the inspecting engineers of the bureau of public roads and the state drafting office will prepare estimates to determine a close estimate on the difference in costs of the two lines.

Out!

"May I come over to see you?" the baseball pitcher telephoned his girl. "I'm not playing today—gotta sore arm." "Then why bother to come over?" she

asked sweetly.

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A New Summer Playground in Western Wayne County

By JOSEPH HICKMAN, State Representative from Wayne County

As noted in the accompanying article by Mr. Hickman the roads in Western Wayne County are generally good. Most of the points of interest he describes are easily reached by automobile—the tourist has only to go there and see for himself a very remarkable region. Due to the fact that Wayne County is practically inaccessible from the east these scenic features will probably never be on a route of through travel and it is for this reason that they are still little known. For all that it is only little known. For all that it is only 42 miles from Sigurd on the Grand Canyon highway to Loa and but 30 miles from Fish Lake to the Natural Bridge. It is hoped that at no distant date better roads will be built into the eastern part of Wayne, and Garfield county as well, not only as utility highways but in development of scenic regions much less known of scenic regions much less known than those herein described but which will come into their own when good roads are built to reach them.

With the announcement that the Denver & Rio Grande Western will expend thousands of dollars the coming summer to advertise and open up a scenic section in Wayne county come also questions from many as to where this section is and what it embraces.

The famous J. W. Powell, of Colorado river fame, so early as 1880, noted the wonderful scenic possibilities of this region, yet many natives of Utah fail to appreciate the value of this section as an attraction for tourist travel.

Attention was directed by the Deseret News of Oct. 21, 1916, to the accessi-bility of the natural wonderland near Fruita in Wayne county. At that time it was pointed out that within a day's ride of Salt Lake City were to be found in Wayne county natural bridges, cliff dwellings, a petrified forest and many other wonders. Since that date, at various times, The News has endeavored to keep the public informed of the possibil keep the public informed of the possibilities in this direction. Yet there is an inexhaustible supply of wonders yet to be mentioned, and with the improvement of the roads since the data given above of the roads since the date given above it is surprising that the resources in this district have remained so long undeveloped.

Wide Variety of Scenery.

Fshi Lake is already well known throughout the state. Few who visit this playground, however, realize that within 30 miles of it stands one of the largest and most wonderful natural bridges in Utah. Along the road to the bridge one passes possibly the widest variety of scenery to be found in a similar space elsewhere in this wonderful region. Crescent Canyon is only two miles from Bicknell-already a byword among duck hunters as near here is lo-

cated the famous Thurber Bottoms, known as the biggest and best duck grounds in the state.

Three miles from Bicknell on the road to the Natural Bridge one passes over a fault in the earth's crust that was noted by Powell's party in 1876. After passing over this fault the river runs in mad torrents and leaps on its 2,000 foot drop from this point to Fruita, 18 miles distant. Along the canyon the highly colored walls attracted the attention of the exploring party mentione and they gave it the name of the Re Gate. Of this the explorer said: "The Red Gate has already been alluded to as the passage by which the Fremore the same of the Red Gate has already been alluded to a same of the Red Gate. The same of the river leaves the valley and flows into the heart of the plateau country. As we approach it from the west the flaming results of the plateau country. of the Trias is seen reaching out sout ward from the Thousand Lake mountain in a rocky wall which has been breached by the river. These beds curve down



Natural Bridge near Fruita, Wayne County.



State road west of Torrey, Wayne Co.

ard on the south side of the gate and sappear beneath the spurs of the quarius."

In Magnificent Splendor.

Let us note that the Aquarius is the ountain to the right as one passes rough the Red Gate. It rises in mag-ficent splendor 3,000 feet from this int to its summit which is 10,000 feet ove the level of the sea. But with well's report at my side I cannot e my own words to describe this grand onument, but quote from him as folws: "The Aquarius should be deribed in blank verse and illustrated on canvas. The explorer who sits on the brink of its parapet looking off to the southern and eastern haze, who irts its lava-cap or clambers up and wn its vast ravines, who builds his mpfire by the borders of its snowd lakes or stretches himself beneath s giant aspens, pines and spruces, forts that he is a geologist and feels mself a poet. From numberless lofty androints we have seen it afar off, long, straight crest-line stretched ross the sky like the threshold of anher world."

Appeal Then and Now.

Thus in the days when few thought nature except as a thing to be conered and turned into means of procing food and clothing, did this secon appeal to the artistic nature of e explorer. How much more will it peal to those who have but to devote eir time to the finding of the beautil and pleasurable in life. And though might fill columns with quotations om Powell's impressions of this secon, yet we pass on to the purpose this article to mention some of the enic attractions to which attention has to been called before through the columns of the press.

The formation found at the Red Gate edominates, with a liberal variety of anges in colorations and the strong sdain for sameness that Nature seemed display in her creation of southern

Utah in general and this territory in particular. Along the road one sees new and unexpected changes, even though as in the case of the writer, he has traveled the road hundreds of times. To attempt a full description of the various objects of interest would be to start something one could not finish, for each object presents a hundred or more different interpretations and there are literally thousands of objects, the results of erratic errosion along the 20 miles from the Red Gate to the bridge.

Here is an object that the kids call Grandpa Pendleton, because that patriarch once wore a tall crowned cap and was rather corpulent. But taken with the rock as a whole the average traveler notes the similarity to various buildings and ships he has known. Why give names to these natural wonders? What they mean to you is nothing to me, what they mean to me is nothing to you; but what they mean to one's own self is everything.

Around Fruita in addition to the Natural Bridge one finds a world fit for study from the time the cliff dwellers wrote on the walls of the canyon in their picture script to the time when the early pioneers knew the narrow de-

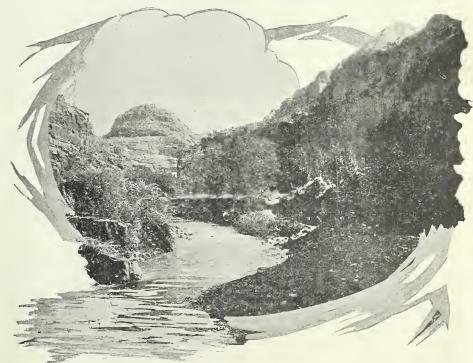
files as havens of refuge.

The roads into Wayne are among the best in the state. There is a section, however, of about 14 miles from Torrey to the Natural Bridge that is much in need of construction. The present route is the one first traveled by the pioneers into the section and there has been little money spent upon it except to remove the debris after the floods that are frequent during the summer. A road was surveyed, it seems, several years ago at a great cost to the state, over a route which leads over the hills on a gentle grade rather than through the deep narrow gorges. What is needed now is the completion of this road as surveyed and in line with the suggestion of Governor Dern the state legislature, it is understood, will be asked to make an appropriation for this purpose. — Deseret News.

What was once considered a road in its natural state, is today only a place to build one.

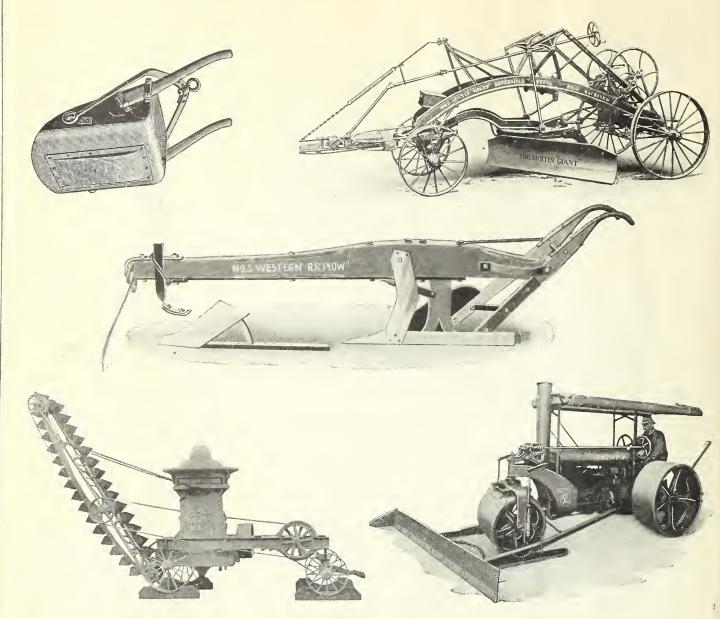
According to the latest figures, there are 2,941,274 miles of highways in the United States. This total is for mileage outside of cities and towns.

Fourteen thousand four hundred and twelve people were slaughtered in automobile accidents last year. What excitement there would be in the country and what protest if that number of people were killed in a single year in an avoidable war.—Detroit Free Press.



The Fremont river issuing from the flaming walls of the "Red Gate."

The Leading Line of Earth Handling Machinery



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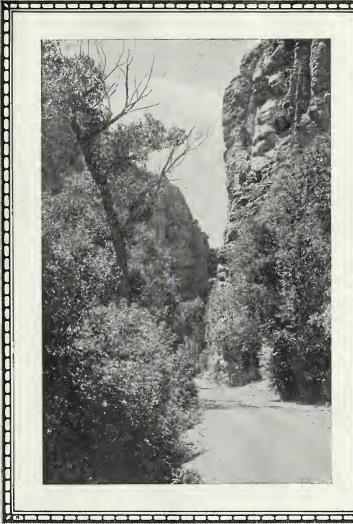
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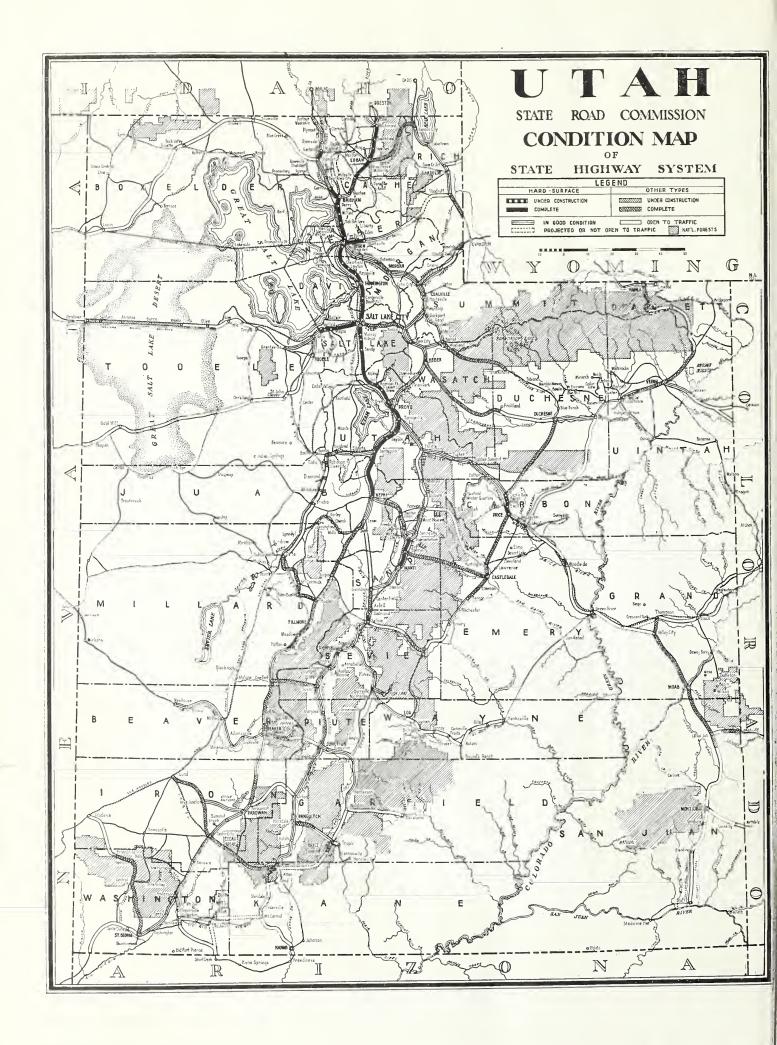




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APRIL, 1925

Number 6

Forest Roads In Utah

BY M. D. WILLIAMS

Highway Engineer, Bureau of Public Roads

Large sums of federal money have been spent in Utah in the improvement of state roads, a considerable part of which has been expended in the con-struction of roads in and adjacent to

national forests.
In July, 1916, a bill was passed by congress making available for expenditure on roads of this character \$1,000,000 per year for the years 1917 to 1926, respectively, to be expended in cooperation with state and county funds. Since that time, additional amounts have been made available for a like purpose, but not restricted to cooperation. From the above sources there had been expended, on January 1, 1925, by the bureau of public roads, in the state of Utah, federal forest funds amounting to a total of \$1,082,-519.80 in addition to cooperative funds supplied by state and county amounting to \$449,672.02 on forest roads.

A definite system of highways has

been outlined in each state, designated as the Federal Aid System, and, in addition to this, a Forest Highway System has been agreed upon, which, in part, coin-cides with the Federal Aid System. It is upon the latter system that forest money has been, and is to be expended.

On January 1, 1925, there had been constructed in the state, on the Forest Highway System, 268.65 miles of forest roads and highways by the bureau of public roads. These roads have served two distinct purposes—a development of natural resources of the state, both in the forests and the agricultural lands adjacent, by added accessibility, and as links in the state and federal systems of highways.

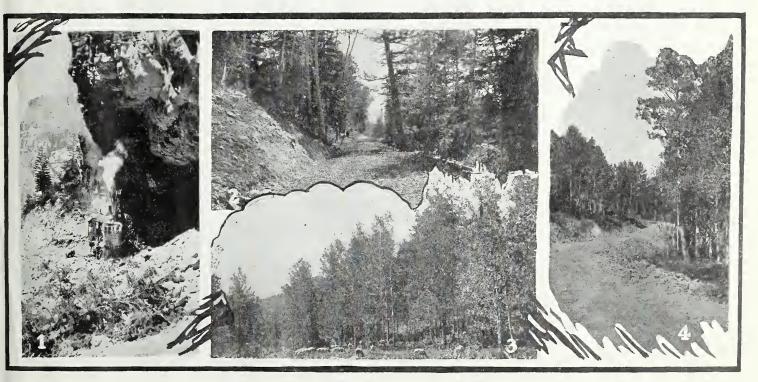
The projects constructed and under construction are of value to the state for many reasons. The more inaccessible communities are connected with adjacent towns and communities. The through

roads are made more safe and more serviceable for the traveling public. Many scenic points and recreational areas, formerly little known because of the difficulty in reaching them, are now easily and safely accessible by auto.

The demand of the public and the rap-

idly increasing amount of travel over all roads have resulted in a standard much higher than was considered necessary when this work first started, with the result that the seasonal mileage now being constructed is much less than that of

a few years ago.
A review of some of the roads constructed by the bureau of public roads since 1918 should be of interest. One of the most used is perhaps the Logan-Garden City, extending from Logan to Garden City on Bear lake, a distance of 37.97 miles. This road was completed to an 8-foot standard in 1921, and carries a heavy traffic during the summer



Views of Cedar-Long Valley road. 1—Steam shovel at work in canyon section. 2—A surfaced stretch near the summit. 3—Grazing scene in vicinity of Cedar Breaks. 4—Between Cedar Breaks and Navajo lake.



Ephriam-Orangeville Forest Road.

months, as a through road from Cache valley to the Bear Lake basin, western Wyoming and the Yellowstone National park, as well as a heavy local traffic to the resorts on the shores of Bear lake. The traffic has already demonstrated the inadequacy of the present width, but funds have not yet become available for a widening program.

Another road of interest is known as the Heber-Fruitland road, which extends from Heber, easterly to the small settlement of Fruitland. This affords a recreational outlet from the valleys of central Utah to the Strawberry lake and adjacent mountains, as well as a through route from Duchesne to the railroad at Heber, during the summer season. The road is now completed to a varying standard for a length of 48.29 miles.

Between 1918 and 1922 a road was constructed connecting the valleys adjacent to Ephraim on the west and Castledale on the east over the Ephraim mountains. A portion of this road was first constructed by the forest service as a means of reaching a forest experiment station on the mountains. This was continued to the summit, and on the east side of the mountains by the bureau; the object being a development of large forest resources and the establishment of a connecting link between the two com-munities. That the latter object has been accomplished is demonstrated by the fact that since the completion of the road, an annual three-day picnic has been held on the summit by residents of San-pete and Emery counties. These annual picnics are unusual affairs; the attendance being from 3,000 to 5,000 people, all of whom carry camp outfits. The result is a reunion of families and friends, under unusual and interesting conditions. This road has made possible the development of local coal mines on the east side of the mountains. It has also broadened timber and grazing resources.

In 1920 a portion of a road following the Salina canyon from Salina on the west to the south end of Emery county on the east was built; it being the plan at that time to complete the entire road by the use of an old railroad grade constructed through Salina canyon many years ago, but which was never used after completion. The railroad company, however, claimed ownership of right of way established by this grade, and has since expended a considerable amount of money on this grade. The railroad right of way claim was supported by court action in 1924. This action has blocked further construction of the highway, as the cost of a road through the canyon, which would not interfere with railroad rights of way, is prohibitive at the present time. This route is passable, but is a rough, and, in places, dangerous road.

The road from Sevier to Cove Fort was constructed in 1920-21 by the bureau to an 8-foot standard, and in 1924 a section 6 miles in length at the summit was widened to 14 feet and surfaced. This section is now comparable with the adjacent roads on the state highway system.

An increasing interest in the scenic wonders in the southern part of the state has resulted in a considerable road development program, which, because of the large forest areas adjacent, has been largely on the Forest Highway System.

A road has been built from Cedar City to the summit of Cedar mountains and Cedar Breaks, and across the mountains to a junction with the Grand Canyon highway, a distance of 45.30 miles. The construction of this road involved some very heavy construction, but, as is usua where heavy construction is encountered the rugged canyons afford exceptiona scenery. This road forms a link between two valley communities, and makes i possible to transport tourists from the railroad terminal at Cedar City to Cedar Breaks and Bryce canyon, and opens up a large area of timber and grazing in the national forests.

A section of the Grand Canyon high way covering nine miles over the Sevie summit was built in 1924, and an additional section extending to Glendale will be constructed in 1925. Twelve miles or road were constructed through Red can yon and on the mountain beyond, in 1923. This covered the bad portions of the road from the Grand Canyon high way to Bryce canyon. The Red canyon road is unrivaled for beauty, passing, as it does, over ideal road material through pine timber and glowing red cliffs erode into unusual and fantastic shapes. The effect is as indescribable as are the views at Bryce, Cedar Breaks, Zion Park of the Grand Canyon of the Colorado!

It is planned to extend the forest high way system of the state as rapidly as funds become available. A total of \$450, 000 will be expended in 1926 and 1927. A continuance of the appropriations wil make it possible to bring the roads through the national forests to a stand ard equal to the other state roads it similar localities, and ample for the traf

fic to be served.

Insult to Injury

Ted—"Tom isn't blowing much abouthat car of his."

Ned—"It was stolen the other day and the thieves abandoned it at the firs corner."—Exhaust.



A Summit crossing in Manti forest.

Gasoline Tax Raised By the State Legislature

The principal change in the gasoline ax law, as amended by the Sixteenth egislature, is the increase in the tax From 2½c per gallon to 3½c. The main reature of the argument presented in avor of the increased tax was that it is necessary to have state funds to finance the construction of interstate connections. It is impossible to levy a statewide tax for state highway construction. Each county, unless the state constitucion is amended, has to provide all funds for surveys and plans, the state's share of costs of federal aid construction and all other construction and maintenance expenditures on its state road mileage. All of which must be paid from a maxinum 3-mill levy. An exception, in 1924, was the participation by the state in naintenance with funds made available from the $2\frac{1}{2}c$ gasoline tax. In the cencral and wealthier counties a state road tax of much less than a three-mill levy provides all the funds necessary for improvement of the roads. In the outlying and low valuation counties the maximum evy in several instances has realized a sum insufficient to even adequately maintain the roads. Donations from various sources, and railroad participation n grade crossing eliminations, enabled the commission to finance federal aid projects in border counties aggregating 34 miles in 1924. Since the state and most of the counties are bonded to the limit for highway construction the prob-lem has been to find means whereby we can improve, within the next few years, the total of 465 miles of state roads on the federal system forming interstate connections.

As to the fairness of the gasoline excise tax the motoring public is reminded that there are 24,000 miles of roads in Utah of which only about 3,300, or less than one-seventh of the total, will be constructed and maintained by this tax, the county roads with a total of 21,000 miles will continue to be constructed and maintained from the general taxes.

The one cent additional tax will yield about \$300,000 additional gross revenue. Last year the interest and sinking fund on state road bonds was \$675,000; this year and hereafter this item will be \$737,500, an increase of \$62,500 to be paid from the gasoline tax, while other expenses and appropriations to be met from the tax will reduce the additional funds available for use on the roads to about \$150,000.

The gasoline tax as amended by the 1925 legislature is as follows:

Be it enacted by the Legislature of the State of Utah:

Section 1. The following words, terms and phrases in this act are, for the purposes hereof, defined as follows:

(a) "Motor Vehicles" shall include all vehicles, engines or machines movable or immovable, which are operated or propelled by combustion of gasoline, distillate or other volatile and inflammable liquid fuels.

(b) "Motor vehicle fuels" are such fuels known as gasoline, distillate, benzine, naptha, liberty fuel and such other volatile and inflammable liquids produced or compounded for producing motive power in internal combustion engines or for the purpose of operating or propelling water vehicles, except the product commonly known as kerosene oil, gas oil, and residium fuel oil.

(c) The term "Distributor" is hereby defined as any person, firm, or corporation who imports or causes to be imported, motor vehicle fuels, as herein defined, for use, distribution or sale, in quantities other than the original packages in which the same was imported, and after the same reaches the state of Utah; and also any person, firm or corporation who produces, refines, manufactures or compounds such fuel in the state of Utah for use, distribution or sale in this state.

(d) The term "retail dealer" is hereby defined as any person, firm or corporation who purchases from a distributor within the state, any motor vehicle fuels in the original packages, in which the same was imported, for use, distribution or sale within the state in quantities other than in the original packages; or who imports into the state motor vehicle

Typical forms of erosion seen from highway in Red canyon, Garfield county.

fuels in the original packages for use of such person, firm or corporation.

Section 2. Every distributor of motor vehicle fuels shall pay a license tax of one dollar for each distributing station or place of business or agency for a period of three months or fraction thereof.

Every retail dealer in motor vehicle fuel shall pay a license tax of one dollar for each place of business or agency for a period of three months or fraction thereof.

Such license tax shall be payable on or before the first day of January, April, July and October of each year, provided, that upon the taking effect of this act the license tax shall be paid until the beginning of the next succeeding quarter.

It shall be the duty of every person intending to distribute or deal in motor vehicle fuel, the sale of which is taxable under this act, to make application to the secretary of state for such license certificates, stating whether he intends to engage in such business as a distributor or as a retail dealer, and at the time of making such application to pay the li-cense tax herein provided; such applica-tion shall state the places of business and location of distributing stations of the distributor or retail dealer in the state of Utah; the name and address of the managing agent, the names and addresses of the several persons constitut-ing the firm or partnership, and, if a corporation, the corporate name under which it is authorized to transact business, and the names and addresses of its principal officers, resident general agent and attorney in fact. After the issuance of a license, quarterly licenses may thereafter be issued upon payment of the li-cense tax without making additional statements.

Section 3. After this act takes effect it shall be unlawful for any person to distribute, sell or use motor vehicle fuels, the sale or use of which is taxable under this act, without having paid the said license tax and without having at all times conspicuously displayed at his place of business or agency a license certificate evidencing the payment of such license tax for the then quarter year or fraction thereof. The net proceeds for all license taxes received by the secretary of state in any month from licenses herein provided, shall be paid quarterly into the state treasury to be covered into the state highway maintenance and construction fund.

Section 4. There is hereby levied and imposed, an excise tax of three and one-half cents per gallon upon the sale, or use as hereinafter provided, of all motor vehicle fuels sold, or used as hereinafter provided, in this state after the taking effect of this act, excepting, however, such motor vehicle fuels as are or have been brought into this state and sold in original packages as purely interstate commerce sales. If any motor vehicle fuels have been purchased outside of the state and brought into this state in

original packages or purchased within the state in original packages from a distributor for the use of the consumer, then such tax shall be imposed upon the use of such fuels. It is the purpose and intent of this act to impose and levy said tax upon the sale or use of motor vehicle fuels as defined in this act whether such fuels are used in motor vehicles or for other purposes.

Section 5. Every distributor and retail dealer as defined in this act in motor vehicle fuel shall render to the secretary of state of the state of Utah, on or before the fifteenth day of each month, on forms prescribed, prepared and furnished by the secretary of state, a sworn statement of the number of gallons of motor vehicle fuel sold or used by him or them during the preceding calendar month, which statement shall be sworn to by one of the principal officers, in the case of a domestic corporation or by the resident general agent or attorney in fact, in cast of a foreign corporation by the managing agent or owner in case of a firm or association and shall contain an itemized account of the date and quantities of motor vehicle fuel sold or used, stating separately the sales made in interstate commerce and those made in broken packages. Bills shall be rendered to all purchasers of motor vehicle fuel by dis-tributors and retail dealers in motor vehicle fuel as here defined.

From the gross amount of motor vehicle fuels produced and sold and shipped into the state and sold or used there shall be deducted two per cent to allow for evaporation and loss in handling. Producers and refiners shall report the total amount produced or refined and sold in the state from which two per cent reduction shall be made and those shipping into the state shall report the total amount received for resale in the state and from this amount there shall be deducted two per cent.

Every agent or employee of a common carrier delivering within this state any motor vehicle fuel, as defined in this act, that has been shipped from without the state, shall on or before the 10th day of each month report in writing all such deliveries during the preceding month to the secretary of state on blank forms furnished by the secretary of state giving the date of delivery, to whom the same was consigned and delivered and the quantity as shown by the bill of lading, and such other information as the secretary of state may require. Any person failing to comply with the provisions of this act shall be guilty of a misdemeanor.

Section 6. Said excise tax shall be due and payable by the distributor or retail dealer on or before the fifteenth day of each month to the secretary of state, for all sales made during the preceding month, who shall receipt the distributor or retail dealer therefor, and pay the same to the state treasurer at the same time settlements are made for other fees collected and the state treasurer shall place the same to the credit of a fund for the payment of interest and sinking fund charges on state road bonds until such fund shall contain an amount which, added to any other funds available for the payment of interest

and sinking fund charges on state road bonds, which will be sufficient to pay all interest and sinking fund charges on state road bonds which shall become due during the calendar year. After such fund has been credited with an amount which, added to any other funds available for the payment of interest and sinking fund charges on state road bonds, will be sufficient to pay such interest and sinking fund charges which shall become due during the calendar year, the state treasurer shall credit all receipts for the said excise tax during the remainder of the calendar year to the credit of the state highway, construction and maintenance fund.

Section 7. If any distributor or retail dealer shall fail or refuse to pay any tax when the same becomes due, the same shall be delinquent on the first day of the next succeeding month. If not paid before such date there shall be imposed a penalty of twenty-five per cent of the amount of the tax. The amount of such tax with penalty shall bear interest at the rate of twelve per cent per annum from the date of delinquency until the same is paid.

Section 8. It shall be the duty of the attorney general to bring an action immediately after any tax has become delinguent under the provisions of this act, for the collection of such tax together with the penalty imposed, and interest

Section 9. No license may be issued to any distributor or retail dealer who has permitted any tax levied and imposed under the provisions of this act to become delinquent, unless and, until such tax and penalty has been fully paid.

Section 10. Every distributor and retail dealer in motor vehicle fuel shall keep a record in such form as may be prescribed by the secretary of state of all purchases, receipts, sales and distribution of motor fuel; such records to include copies of all invoices or bills of all such sales and shall at all times during the business hours of the day be subject to inspection by the secretary of state or his deputies, or such other officers as may be duly authorized by said secretary of state.

Section 11. All motor vehicle fuel, as defined in this act, distributed by any distributor to the distributor's branches throughout the state of Utah, shall be deemed to have been sold at the time of such distribution and shall be subject to the requirements of this act, the same as if sold to the public at large.

Section 12. Said excise tax shall not be imposed on motor vehicle fuel when sold for exportation from the state of Utah to any other state or nation.

Section 13. Any distributor, retail dealer, associations of persons, firm or corporation violating any of the provisions of this act, shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished by a fine of not more than \$1,000, or by imprison-ment in the county jail of not more than six months, or by both such fine and imprisonment.

This act shall take effect April 1,

Maintenance Budget for 1925 Is \$417,000

To effectively maintain the state roads in 1925 will require an estimated expenditure of \$417,000. The total costs for state highway maintenance in 1924

was \$402,500.

Following the plan adopted in 1924 the state will match the funds advanced by counties from the state road tax with equal amounts from the gas tax. Several interstate routes will be maintained 100% from the gasoline tax. These are Echo canyon to the Wyoming line, 30 miles, \$3,560; Vernal to Colorado line, 35 miles, \$2,595; Thompson to Cisco to Colorado line, 52 miles, \$3,215; Lasal Junction via Monticello and Lockerby to Colorado line, 51 miles, \$2,550; Anderson's Ranch via St. George to the Arizona line and Anderson's to Zion park to Arizona, 111 miles, \$10,505; Grantsville to Nevada line at Wendover, 94 miles, \$10,945; Tremonton to Snowville to Curlew Valley Junction, 60 miles, \$2,995.

The mileage to be maintained and the total amounts budgeted, revised to include roads added to the state system by recent legislative enactment are as

llows:		
County	Mileage	Budget
Beaver	$98.\overline{4}$	\$13,473
Box Elder	207.7	16,022
Cache	78.1	14,722
Carbon	104.0	13,874
Daggett	22.6	1,430
Davis	33.2	8,952
Duchesne	142.3	14,730
Emery	130.8	15,691
Garfield	129.1	16,670
Grand	119.3	14,996
Iron	181.8	22,059
Juab	103.1	17,212
Kane	50.6	5,680
Millard	121.5	20,434
Morgan	23.9	6,475
Piute	50.7	9,115
Rich	84.0	9,215
Salt Lake	64.4	18,015
San Juan	136.1	11,885
Sanpete	141.6	21,481
Sevier	146.0	17,969
Summit	107.8	18,210
Tooele	242.5	20,678
Uintah	76.0	10,815
Utah	155.3	27,040
Wasatch	99.8	12,423
Washington	171.3	20,525
Wayne	92.0	6,125
Weber	52.1	11,361
Totals	3,166.0	\$417,277

Inland Engineering & Construction Co.

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Celebrate Completion of Transcontinental Routes

An exposition will be held in Reno, Nevada, during the summer of 1926 for the purpose of celebrating the completion of transcontinental routes and in particular the New York to San Francisco

ighway.

Its purpose is to show also the industrial progress in the west, aside from highway improvement. Eleven western states are expected to participate: Washington, Oregon, Utah, Nevada, California, Idaho, Montana, Wyoming, Colorado, Arizona and New Mexico.

Although greatly desirous of assisting Nevada in this laudable enterprise the

Nevada in this laudable enterprise the Utah legislature found that the needs of our state institutions during the next two years would leave no funds available for participation. A joint resolution of both houses commended the undertaking of our sister state and recommended that Utah's participation be financed through

private contribution.

Whether or not we will be able to do the state full justice at Reno we will, at least, say it with roads, for Utah is most busily engaged at the present time in putting in the best of travelable condition the highways leading from east to west across the state. A greatly increased traffic is expected this year following the completion of the Wendover-Knolls road over the Great Salt Lake desert.

We Receive Advice

With our extensive mileage of roads through public land areas and the difficulties which the state has experienced in coping with the expense of construction the loose ends of some transconti-



Castle Gate, on Price-Grand Junction highway.



New gravel road, F. A. P. 33, a popular drive between Brigham and Wellsville.

nental routes appear to have collected in Utah. We have held in consequence the position of a buffer state and also in the matter of which routes to improve first, a somewhat buffeted state.

Due to our slender financial resources it has proved a large undertaking to build the many good roads now completed north and south through the more populous regions, and also to bring within reach of the motorist some of our points of scenic interest which have attained national fame.

There is no question as to the value of the service rendered by the various trail or highway associations in stimulating road improvement. They are among the pioneers in the movement to "See America First." Since the inception of federal aid, however, the pioneer stage has begun to fade into the back ground and we now have a system of designated routes extending across the continent, roads which have an official status, and which the states and the national government have agreed shall be constructed and maintained.

Interstate Routes to Be Officially Numbered and Marked

On February 25 the secretary of agriculture, Howard M. Gore, who resigned March 4 to become governor of West Virginia, appointed a commission of national and state road officials to investigate and report upon the best means of numbering and marking highways of interstate character. For the convenience of traffic it is desired that the system of marking should not stop at state lines but that the designation of each main artery should be uniform throughout its entire length. Information recently from

the committee indicates that there are at least 256 named routes and 97 different associations each promoting one or more interstate highways. Overlapping routes cover an extensive mileage with resultant confusion, and to add thereto well-known highway names often have alternate routes between points.

The committee is now at work on a plan whereby the national highways may be satisfactorily designated and in a manner suitable to both state and national requirements.

Good roads, canals and navigable rivers by diminishing the expense of carriage, put the remote parts of a country nearly on a level with those in the neighborhood of a town; they are, upon that account, the greatest of all improvements.—Adam Smith's "Wealth of Nations."

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Utah Fire Clay Co.

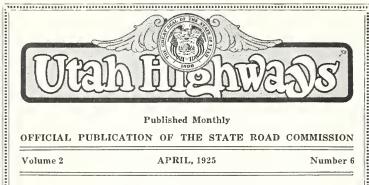
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H. V. RICHARDS, Editor

HIGHWAY ENACTMENTS OF THE SIXTEENTH LEGISLATURE

After the smoke of battle has cleared away, it is found that an imposing array of bills has survived all the dangers to which they are peculiarly liable, have found their way through committees, through both houses of the legislature, have been duly approved and are now ready to take their place on the statute books. Among them are several laws which affect the highways, and this summary will show that considerable constructive legislation in the interest of good roads was effected as a part of the work of the Sixteenth session.

The recommendation of the road commission to the governor and legislature stressed chiefly the necessity of improving our interstate connections and the need of funds therefor in matching federal aid. There are state roads not on the federal aid system which cannot be improved to standard requirements without state aid but as noted by the commission in its recommendations, the most pressing problem is that of improving the trunk lines through the border counties.

The attitude of the people's representatives was, in effect, a vote of confidence in the state's road officials and approval of the highway program:—There was no tinkering with the form and organization of the commission, there will be an augmented revenue from an increased gasoline tax and other sources, and lastly, the state road system is added upon by some one hundred miles. This last is of doubtful utility since there are now in need of improvement 465 miles of state roads connecting with those of adjacent states and every addition to maintenance costs must be taken from funds otherwise available for construction.

H. B. 108 increases the tax on sale of gasoline from 2½ cents to 3½ cents a gallon, effective April 1. It will increase the revenue from this source by about \$300,000, or an estimated total of \$975,000 from the gas tax for the year. The motor vehicle tax for 1925, with the assumption of 10% normal increase for the year, will yield \$534,600. Deductions from this combined fund before any sum is credited to the state road commission are interest and sinking fund on \$7,000,000 of state road bonds, \$737,500; \$60,000 for administration costs of the motor vehicle and gas tax laws; \$60,000 administration costs of the road commission; and \$25,000 refund to counties for expenses incurred in flood devastated areas, leaving a balance to be credited to the road fund of \$627,100. Estimated highway expenditures for 1926 are \$540,000 for maintenance;

\$200,000 for miscellaneous construction and betterments, and \$285,000 as the amount necessary to match the federal aid appropriation, a total estimated expenditure of state funds for construction and maintenance of \$1,025,000. With the estimated credit balance of \$627,100 above noted as remaning from the motor vehicle and gasoline tax it is evident that some \$400,000 must be raised from other sources, chiefly from the county state road tax. This tax has averaged \$640,000 for the past few years, so although we are still far removed from entire state control of the state roads, we have at least made a long stride in that direction.

S. B. No. 162 provides additional revenue by the taxation, on a mileage basis of common carriers, using the public highways. Receipts from this tax are to be credited by the state treasurer to the state road fund without delay or deduction. The law reads that automobile corporations, partnerships or persons engaged in transporting passengers or freight on public streets or highways between cities and towns, whether holding a certificate of convenience and necessitiy issued by the public utilities commission or not, shall pay taxes for the maintenance of such public streets or highways as follows: For freight, two-thirds of one cent per ton mile on all hard surfaced roads (concrete or bituminous pavements) on other roads one-fourth of one cent per ton mile. For passenger service one-fourth of one cent per passenger mile on hard surfaced roads and one-tenth cent on other roads. On the above basis the state road commission should receive twenty-five cents for every ton of freight hauled over the Salt Lake-Ogden road, hard surfaced all the way, and seven cents for every passenger carried between Salt Lake and Tooele, over a road paved to the Salt Lake county line.

It is required that operators shall certify to the public utilities commission on or before the tenth day of each month a summary of daily travel for the preceding month on forms provided by that commission and that on or before the 20th day of each month the public utilities commission shall certify to the state treasurer the total amount for operations during the preceding month. The amount due the state shall constitute a first lien upon property until paid. The public utilities commission is now engaged in preparing forms that will fill the bill and tax receipts from truck and bus lnes operations are estimated as high as \$50,000 yearly. This law is the outgrowth of a very general public sentiment that the truck and stage lines are not paying, through the motor vehicle and gasoline tax, their just proportion of the costs of highway maintenance. At any rate these operators have now acquired a place in the sun, and some interesting information covering mileage, tonnage and other data will be published as available.

Another requirement, S. B. No. 87, is that auto transportation companies shall furnish upon granting of certificates, liability and property insurance, \$5,000 for each person and not to exceed \$10,000 for all persons, and \$1,000 property insurance.

H. B. No. 143, amendments to the motor vehicle law, all effective January 1, 1926, carry an average increase of 30% in license fees of trucks of 2½ tons capacity and over. Present rates and those beginning 1926 for all pneumatic tires and two or more solid rubber tires are as follows:

Tons	Pneuma	tic Tires	Solid Rub	ber Tires
Capacity	1925	1926	1925	1926
2½	\$26.35	\$30.00	\$42.25	\$65.00
3	33.75	40.00	48.75	75.00
31/2		55.00	80.00	100.00
4		70.00	100.00	125.00
5	67.50	100.00	140.00	140.00

Other amendments to this law will put into effect more stringent regulations in regard to registration of motor vehicles and in connection therewith all transfers of ownership. The motor vehicle department in the secretary of state's office will keep a complete record of the history of each individual vehicle indexed and cross indexed in addition to which every vehicle shall carry a card in a case provided therefor, within the car and in view from the driver's seat which will also carry a record of all registrations and transfers of such vehicles.

The new roads added to the state road system are the proposed route from Rockville to Short Creek, 8 miles, in Washington county, shortening distance in the vicinity of Zion National park; 10 miles near the eastern border in Uintah county connecting with the Rangely-Meeker highway in Colorado; 47.2 miles Silver City to Delta in Juab and Millard counties and 31.4 miles, Levan to Gunnison, in Juab and Sanpete counties. This last is shown on the 1916 map as a state road. Later it became a county road with most indifferent

Estimated Cost

\$ 52,948.20 93,686.67 35,536.28 379,396.49 140,727.42 28,953.66

141,000.68 153,288.73 80,385.19 17,763.08

52,862.19 85,823.99 45,628.17 55,782.12 57,506.28 34,886.04 15,363.10 8,852.60 40,456.08 21,151.10

Status of Federal Aid Projects

By F. S. THOMPSON, Chief Draftsman

e d		Projects Under Constru	iction or	Contr	act N	[arc]	h 31, 1925
No.	County	Name	Type		Per Ct Comp		Contractor
7-A	San Juan	La Sal Junction-Big Wash	Gravel	5.06	15	Butl	er & O'Berto
17-B	Juab	Chicken Creek, Millard Co.	Gravel	13.87	97	Haw	ley, Anderson & Hinkley
19-B	Piute	Junction-Red Bridge	Gravel	5.28	100	Clar	k Construction Co.
51-A	Tooele		Gravel	41.40	86	Krof	t, Bundy, Zimmer & Lamus
55-A-1	Washington	Ash Creek-Iron Co.	Gravel	8.65	66	Pax	ton, Dorrity & Black
55-A-2	Washington	Ash Creek Bridge	Con.Arch		10		tney & Reynolds
59 30. A	Davis	Layton-Clearfield	Resurf. Gravel	$\frac{4.11}{11.0}$	$\frac{50}{32}$	Was	erg Bros. atch Grading Co.
60-A 63-A-1	Summit Box Elder	Echo-Emory Chase-Bear River City	Gravel	5.09	90		Nelson
63-A-3	Box Elder	Malad River Bridge	Concrete		38		J. Burke & Co.
35-A	Utah	Wasatch-Bridal Veil Falls	Gravel	3.37	35		nd Engr. & Const. Co.
67	Millard	Scipio-Holden	Gravel	12.04	25		vley, Anderson & Hinckley
71	Uintah	Uintah River Bridge	Steel	120 ft.	100	C. F	'. Dinsmore & Co.
72	Sanpete	Fairview-Mt. Pleasant	Gravel	4.98	55	Gray	y & Murdock
77-A	Sevier	Richfield-Elsinore	Gravel	5.53	8		G. Young & Co.
31-A-1	Washington	Anderson's-Toquerville	Gravel	2.83	70	Rale	eigh & Higbee
31-A-2	Washington	Toquerville Bridge	Concrete				A. Kemp
32-A	Beaver	Manderfield Hill	Gravel	0.5	25	Inla	nd Engineering Co.
98-A 98-B	Beaver Millard	Wild Cat-Millard Co. Beaver CoCove Fort	Gravel Gravel	$\frac{5.8}{2.1}$	$\frac{10}{10}$	Inla	nd Engineering Co. nd Engineering Co.
70-D	Miliaru	Beaver CoCove Fort	Graver	2.1			The Engineering Co.
		Projects Recently Advertised					con's Tospowillo project or
No.	County	Name	Type		Len	gth	son's-Toquerville project on to the park and the Toquer
E	•					_	are all under contract and con
51-B 53-A <i>-</i> 2	Tooele Box Elder	Timie-Knolls Bear River Bridge	Gravel Concre		$\begin{array}{c} 36.1 \\ 267 \end{array}$		well advanced.
03-A-Z	Dox Elder	bear liver bridge	Concre	: ve	201	r t.	Various bills designed t
•	Project	s for Which Plans Have Been A	pproved				traffic were proposed and ne jected. One which was pass
31-A	Sevier	Salina-Aurora	Gravel		4.12	Mi.	proved carries for intoxi
31-B	Sevier	Aurora-Sigurd	Gravel		5.93	Mi.	drivers a jail sentence of
51-C	Sevier	Sigurd-Reihfield	Gravel		7.39	Mi.	days to six months without
	Duniost	a for Which Dlang Hove Poor Su	hmitted				of fine.
GG A		s for Which Plans Have Been Su Parowan-Winn Hollow	Gravel		9.6	Mi	A bill which passed both
66-A 68-A	Iron Millard	Cove Fort-Dog Valley	Gravel			Mi.	failed to gain the governor
36-A 34-A	Duchesne	Myton-Antelope	Gravel		9.2	Mi.	was H. B. No. 41, which
		lans in the Course of Preparati					make the state road commiss civil action in controversies
_		-			0.0	TA (T.)	contracts. The substance of
63-B	Box Elder	Bear River City-Tremonton	Gravel			Mi. Mi.	is that while the arguments
35-B	Utah	Bridal Veil Falls-Orem Spanish Fork-Soldier Summi	Gravel			Mi.	are attractive, in that no one
73-A 94-B	Utah Duchesne	Antelope-Duchesne	Gravel		10.3	Mi.	the right to judge his own ca
94-D	Duchesne	Myton-Roosevelt	Gravel		9.5		ence has shown it to be inex
7-0	Duchesite	LLY COIL AVOIDO VOIC	G 244 1 01				a state to permit itself to b
•		Surveys Completed					another feature to be consid-
19-D	Piute	Red Bridge-Garfield County	Gravel		3.5		in Utah the road commissi
34-A	Piute	Marysvale-Sevier	Gravel		4.9		contracts for construction act
38-B	Millard	Dog Valley-Kanosh	Gravel		14.0	Mi.	ministrator of federal and co and in the event of an action
		Proposed New Work					a decision against the com
30-B	Summit	Emory-Castle Rock	Gravel		8.7	Mi.	proposed law would render
32-A	Morgan	Mountain Green-Weber Co.	Gravel		1.6	Mi.	inoperative for the reason
62-B	Weber	Morgan-Devil's Gate	Gravel			Mi.	not clear as to who could or
no a	D	Danilla Cata Wahan Ca	Cnarral		1.0	TAT:	the judgment

prospects, but is once more back in the fold for the reason that it shortens the listance to Gunnison by fifteen miles from points north of Levan.

Davis

Weber

Emery

Emery

Tooele

Tooele

Grand

Iron

32-C

32-D

74-A

75-A 78 36

37

Devil's Gate-Weber Co.

Carbon Co.-Woodside

Cedar City Salt Lake Co.-Timpie

Green River-Floy

Mills-Tooele

Woodside-Green River

Davis Co. Line-Wash. Ave.

The appropriations bill carries an item of \$35,000 for reimbursement of citizens of several towns along the Zion Park highway in Salt Lake, Utah, Juab, Millard, Beaver, Iron and Washington counties for advancing funds as the state's share of federal aid construction in the vicinity of Zion park. These projects, the Black Ridge route, including the Ash creek concrete arch bridge, the Ander-

Gravel

Gravel

Paving

Gravel

Gravel

Timber Bridge 265

Timber Bridge 250 Ft.

Timber Bridges 420 Ft.

1.9 Mi.

5.5 Mi.

1.13 Mi.

28.0 Mi. 8.6 Mi.

Ft.

ı the branch rville bridge onstruction is

to regulate nearly all ressed and apricated auto from thirty t alternative

h houses but r's approval, proposed to sion liable to arising over of the veto s for the bill e should have eause, experiexpedient for be sued, and dered is that sion in most cts as the adcounty funds, n followed by nmission the a judgment that it was would meet the judgment.

A NEAR ACCIDENT

"We weren't doing anything like thirty, your honor. We may have been hitting it up a little when we struck the hill, but we were down to twenty

miles within two car lengths."

Next Witness: "We never went faster than fifteen miles, your honor, and when we came to the cross road we slowed down to ten."

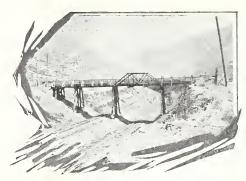
Defendant: "We were practically at

a standstill when the officer came up—"
The Court: "I'll have to stop this thing now or you'll be backing into some one. Twenty-five dollars."-American Motorist.

Spanish Fork Canyon Road to Be Improved

Construction will begin during the summer on the first unit of federal aid project No. 73, Spanish Fork-Soldier Summit, Utah county. Survey notes are now in the office covering 30 miles of the project between Spanish Fork and Detour, eight miles west of Soldier Summit, at which point there will be an overhead crossing of the Denver & Rio Grande Western railroad. The federal funds to be used on this project will reduce the year's construction program in Provo canyon, the county commissioners and the road commission having agreed to begin the improvement of the Spanish Fork canyon route this year. On the portion now surveyed the state highway crosses the D. & R. G. W. double track at grade five times. At Thistle there are six side track crossings and also a crossing of the Marysvale branch line. All of the above crossings with the exception of the one at Detour will be eliminated by relocation. At Thistle there crossing on the Thistle-Mount Pleasant connection. At present there are two overhead crossings in Spanish Fork canyon, one at Gilluly, and one near the mouth of the canyon about three miles from Spanish Fork. The former is beyond the eastern limit of the survey, the latter will be reconstructed and the

alignment at this point greatly improved. Considerable heavy grading will be encountered in the canyon, particularly in the vicinity of Thistle and at Red Narrows east of Thistle. The section that will probably be improved this year is from Castella to two miles east of Thistle, 6.9 miles. Further up the canyon, between the Red Narrows and Detour, there is a 10.5 mile section which can be



Present overhead at entrance to Spanish Fork canyon.

constructed at about the cost of the Castella-Thistle section. The early improvement of the latter, however, is desired

by the county commissioners. Negotiations between the road commission and the Utah and the D. & R. G. W. railroads are under way with reference to encroachments and construction will begin when these are satisfactorily completed.

The location survey will be extended this summer from Detour to Soldier Summit and thence, on federal aid project No. 95, to the end of the pavement at Castle Gate.

Traffic Census to Be Taken on State Roads

The engineering department of the state road commission will make a count of traffic on the state roads during the year. The census will be taken in cooperation with the state road maintenance organization in each county. The behavior of different types of roads under measured traffic conditions will be observed and comparisons made of the carrying capacity of road surfaces under given traffic. The count will also be used as a basis for the allotment of funds for next year's maintenance program

The present plan is to take the census simultaneously throughout the state for one day, beginning in May and continuing at two-week intervals into December. Fifty-three stations on the state road system will be occupied by the tally checkers. These stations have been selected, so far as possible, at junction points, where the count may be made on two or more roads at once. Work will begin at 6 a. m. and continue to 10 p. m., with the exception that at a few points it is planned to take a 24-hour count two or three times during the year for the purpose of determining a factor to be used in arriving at a figure for the total number of vehicles daily on both high and low-traffic roads. The count will differentiate between Utah vehicles and those from other states, between passenger cars and trucks and between trucks of two and one-half tons and less and those above that weight.

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Construction in Utah With Federal Funds

The Federal Aid Road act, passed by congress in 1916, provided that the United States should aid in the construction of rural post roads. The administration of the law is under the direction of the secretary of agriculture acting through the bureau of public roads. Since 1916 the total appropriation of federal funds amounts to \$540,000,000, of which Utah's share is \$6,16,473. The apportionment is based upon the relative proportion or area, population and miles of post roads of each state to all the states. These funds are used for construction only, the federal bureau does not participate in purchase of right of way, in preliminary engineering or in maintenance. Adequate maintenance by the state of the roads constructed with federal aid is, however, a most important factor under the federal law, and the regulations made by the secretary of agriculture affecting its

administration. Among the revisions by congress of the federal road act of 1916, the most important is that creating the seven per cent system. The original act provided for the improvement of post roads only, which would not have, when carried to completion, provided interstate connections and would have left unimproved, so far as federal aid was concerned, long sections on our main highways.

The amendment creating the seven per cent system, approved Nov. 9, 1921, provides that the national government will cooperate with the states in the building of a system of federal highways, which when completed will form a connected system of about 180,000 miles. Seven per cent of the total highway mileage of each state is the maximum federal aid mileage, and federal funds may be expended only on the system designated. Not less than three per cent

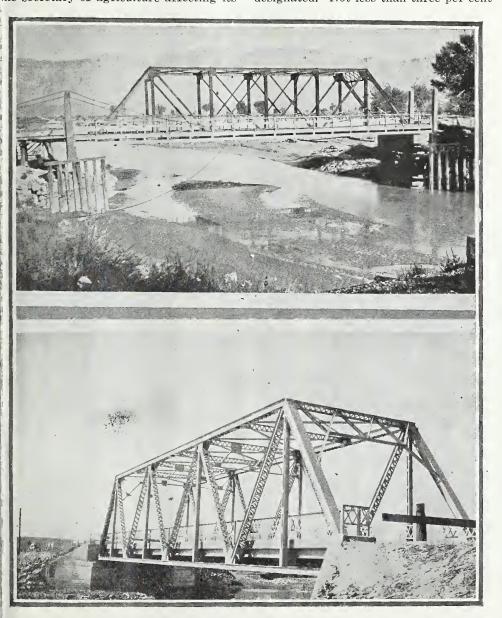
of such mileage must be on through routes, that is, roads which form interstate connections. The remainder may be made up of roads which do not reach the state borders but which must connect with the primary system. In Utah at the time of adoption of this amendment the state and county roads totaled 24,050 miles, which allowed us 1,684 miles of federal highway. The system approved to date comprises 1,567 miles laid out over the trunk highways of the state with the exception of the branch in Washington county to Zion park and the proposed road from the park to Mount Carmel on the Grand Canyon highway. The purpose of this connection is to form, in conjunction with the completed forest road from Cedar City to Gravel Springs Junction a loop which will shorten distance in traveling between the points of scenic interest in southwest Utah and also to afford a better all-year route into Kane county. The remaining federal mileage to which we are entitled is reserved pending the approval by the state and the federal bureau of a route into the Uintah basin to a connection with the federal highway from Duchesne to the Colorado line and from Tremonton to the Idaho line.

Federal Cooperation

Another revision of the federal aid act increases the percentage of participation by the government in the costs of road construction in any state where the unappropriated public lands exceed 5% of the total area of all lands in the state. In Utah the public lands comprise nearly half the total area of the state. In this state the percentage of federal participation is the original 50 per cent plus 24.8542 per cent or onehalf the percentage which the public land area bears to the total area, which means that for every dollar for which the state is obligated in improving the federal system subsequent to July 1, 1921, we may request nearly three dollars in federal aid. This does not increase our annual allotment of federal funds which is now about \$850,000 annually, but only the ratio of participa-tion in costs. The maximum cost of construction in which the government will participate is \$30,000 per mile, ex-clusive of structures over 20 feet clear span. Where the federal aid is requested on the maximum basis the amount paid the state is \$22,456.26 per mile. On roads costing less than \$30,000 per mile the usual ratio is 74% of federal aid and 26% local funds. Procedure for Initiating a Federal Aid

Before the federal bureau will agree to its participation in the construction costs of any portion of a highway included within the federal aid system, it is essential that the state road commission submit a statement setting forth the probable cost and include therewith evidence to show the source and availability of funds for defraying the state's share of the costs of the improvement.

To this end, and since the state itself has no funds available for construction, a cooperative agreement is signed by the county commissioners and the state



Above, the old and a new, 100-ft. steel span replacing suspension bridge at Woodside. Below, 120-ft. span bridge over Uintah river near Ft. Duchesne. Being in Indian country the cost of this structure is met entirely from federal funds.

road commission whereby the county agrees to furnish the 26 per cent of the construction costs required in this state, and also to provide the necessary funds and also to provide the necessary range for the preliminary engineering which include the survey and preparation of such plans and estimates as are re-mined by the federal authority. The quired by the federal authority. commission agrees to cause the necessary survey and plans to be made and to proceed with the construction of the project in accordance with the terms of the agreement.

The cost of the project as shown on

the cooperative agreement is based on the reconnaissance estimate and is often changed after the survey and plans are completed. Upon the execution of the cooperative agreement by both parties the county is requisitioned for an amount sufficient to cover the preliminary engineering, for which no estimate of costs is made in the cooperative agreement, which includes figures relative to con-

struction and maintenance only. The Project Statement

Under the early regulations put in effect by the secretary of agriculture a reconnaissance estimate of costs of a project included in a statement of location, length, type and desirability of improvement would, upon approval by the secretary, encumber federal funds to that project in the estimated amount although work might not commence thereon for two years or only a small section

require immediate improvement. Under a recent regulation project statements are issued to cover entire routes between what has been previously approved by the secretary as "control points." Federal funds are not obligated therefore except as certain sections are designated for construction under project agreement. Project agreements are signed by the federal and state authorities following the approval of detailed plans and estimates, the advertising for bids and the award of contract there-under. The federal obligations under the project agreement become due and payable only upon periodical certifica-tion of work performed and materials used in the roadway

Progress of Construction

Without taking into consideration some seventy miles of road now nearly completed in projects under construc-tion there has been built to date the following mileage with federal aid:

Graded earth1	21.83
Gravel	267.18
Concrete	88.06
Bituminous	8.44

Total485.51 Of the above total 166 miles of road which are not now a part of the federal seven per cent system were improved with federal aid. The total cost of construction, including fourteen bridges built as separate projects, was \$7,500,000.

Highway Legislation Before Last Congress

The last congress had before it several matters of legislation affecting highways. As usual, more bills were introduced than became laws. The following were of most general interest.

Bills Which Became Laws
Dowell bill (H. R. 4971) authorizing appropriations under the federal highway act \$75,000,000 for the fiscal year 1926, \$75,000,000 for the fiscal year 1927; and for forest roads and trails \$7,500,-000 for the fiscal year 1926 and \$7,500.000 for the fiscal year 1927. This bill also makes organic law that all authorizations for roads shall hereafter be apportioned to the states by the secretary of agriculture on January 1 of each year. Nontaxable Indian lands are hereafter to be considered as "unappropriated public lands" in the operation of the federal highway act.

Temple bill (H. R. 4522), to complete topographic survey of the United States. Reece-Capper bill (H. R. 7269) directs

the secretary of war to transfer to the secretary of agriculture 100 5-ton tractors and 1,000 trucks for use on roads.

Pan American Congress of Highways (S. J. Res. 190) authorizes the president of the United States to appoint a commission of five to attend the Pan Amercan congress of highways at Buenos Aires Oct. 3, 1925. This congress is the result of the visitation made in June of last year to this country of representatives of all the Pan American countries who visited many of our highways under the escort of the state highway departments.

Bills Which Did Not Become Laws Colton bill (H. R. 6133). This bill provided that in the case of any state containing unappropriated public lands exceeding 5 per centum of the total area of all lands in the state in which the population does not exceed 10 per square, mile of area federal aid up to 100 per cent may be used on the primary sys-

Also in the case of any project involving construction in mountainous swampy, or flood lands on which the average cost per mile for the grading and drainage structures other than bridges of more than 20 feet clear span, will exceed \$10,000 per mile; and also in the case of any project which, by reason of density of population or character and volume of traffic, the state highway department and the secretary of agriculture may determine should be improved with a surface of greater width than 20 feet, the secretary of agriculture may pay more than \$15,000 per mile. In no event shall the payments of federal funds on any project under this provise exceed 50 per centum of the cost of the project, except as such payments are authorized to be increased in the public land states.

That in apportioning appropriations for forest roads no state entitled to share in such appropriations shall receive less than \$20,000 of each year's allotments This bill will be reintroduced in the next

Naming Oregon Trail (S. 2053). Pass-(Continued on Page 11)

congress.

5 Important Causes of Culvert Failures ---

Field investigation of some 18,000 culverts indicates the five principal types of culvert failures are:

CRACKING:

Due to load of traffic and fill on brittle material. Can be avoided by using elastic materials.

DISJOINTING:

Caused by lateral soil movements and poor foundations. Can be minimized by using culverts having a positive bond between sections.

BREAKING:

Due to impact of traffic on culverts under shallow fill. Can be avoided by using flexible type culverts.

UNDERMINING:

Caused by erosion of foundations. Can be minimized by using types of culverts which adapt themselves to unusual conditions.

DISINTEGRATION:

-Of Porous Materials. Caused by freezing and thawing. can be avoided by using a non-porous material.

Of Metallic Materials. Caused by electrolytic action set up in the metal. Can be minimized by using culverts made of Armco Ingot Iron which contain a minimum of impurities.

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Motor Vehicles in U.S. Now Number 17,897,609

The annual statistical review of the automotive industry compiled by the B. F. Goodrich Rubber company, gives a total for 1924 of 17,897,609 motor cars and trucks in the United States. This is an increase of 2,676,426 or 17.5 per cent over 1923 when 15,221,185 vehicles were in use. Over 90 per cent of all the cars in the world are operated in the United States.

Every state in the union showed a gain in the number of cars registered during 1924. The automotive industry produced and sold 3,550,898 new cars and trucks during the year. Today and trucks during the year. Today there is one car for every 6 people in the country as opposed to one car for every 12 people five years ago.

There are now five states having over a million cars. New York is still the leader with 1,421,253, a gain of 207,163 over 1923. California is in second place with 1,321,480, a gain of 285,540, the largest numerical gain in any state. Ohio is third with 1,230,000 and Pennsylvania is a close fourth with 1,221,-811. Illinois, fifth in rank, is now in the million class with 1,119,500 cars and The combined registration in these five states is greater than that of the entire country in 1918 and is double that of the world today, exclusive of the United States. The gain made in any one of these states during the past year is greater than the total registration of all Australia.

Nevada clings to the cellar position with 18,327 vehicles. This, however, is more cars than there are in all of

Russia.

The largest percentage gain was made by Florida where the increase during the rast year totaled 42.5 per cent. Evidence of the popularity of the nation's southern playground and its prosperity is reflected in the motor vehicle registrations. Other southern states showing large percentage increases were Mississippi with 28.4 per cent increase and North Carolina with 39.9 per cent.

The farmer is finding the motor car more necessary to his welfare each succeeding year. Five agricultural states, Iowa Kansas, Minnesota, Missouri and North Dakota, now have in use 2,193,910 motor vehicles, registering gains of from 7.1 per cent to 14.6 per cent during the past year. In these states there is now one car for less than each 5 people or practically one for every family. Improved conditions are reflected in the south where the average increase was over 30 per cent in the states of Alabania, Florida, Louisiana, South Carolina and Mississippi. These five states now have as many cars as the Dominion of Canada.

During the past year the number of people in the country for each car has been cut from seven to six. California has the most cars per capita with one for less than every 3 people. If California's average were nation-wide, there would be approximately 40,000,000 cars in use in the country, or more than dou-ole the present registration. If the industry continues to grow at its present

rate, within the next two years there will be one car for every average American family of five people. The fewest cars per capita are found in Alabama where the average is one car for every 15 inhabitants.—The Nation's Highways.

Highway Legislation Before Last Congress

(Continued from Page 10)

ed senate, died in committee on roads of

the house after extensive hearings. Reorganization bill (H. R. 9629). This bill provided for the transfer of the bureau of public roads to the department of the interior and the creation of a new department of transportation in the department of commerce. This bill did not get to the floor of either house of congress. It will be reintroduced in the next congress.

Denison bill (H. R. 10468). This bill proposed granting privilege of erecting toll bridges under certain restrictions. No action was taken in either house of congress. Will be reintroduced in the next congress.—American Highways.

Rural Highways Cost Eight Billions

The rural highways of the United States have cost the nation approximately \$8,500,000,000 since 1904. During the last four years the annual highway bill has averaged about \$1,000,000,000.

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Board Makes It the King of the Road

Wisconsin Student Winner of Good Roads Essay Contest

John Liska, high school youth of Wisconsin Rapids, Wisconsin, is announced as winner of the H. S. Firestone Four Years' University Scholarship for 1924, his essay having been chosen as the best of those submitted in the fifth good roads essay contest.

Liska's essay represented Wisconsin in the national competition, in which one essay was entered from each state and territory. It had previously been selected as the best of those from his state by a committee named by the extension division of the University of Wisconsin. More than 200,000 high school students throughout the United States and territorial possessions sought the honor which fell to him. The contest was conducted by the hghway education board, of which Dr. J. J. Tigert, United States commissioner of education, is chairman.

National judges who reviewed the state essays were James J. Davis, secretary of labor; Dr. W. O. Thompson, president of the Ohio State university, and Merle Crowell, editor of the American Magazine. Liska is the fifth high school student to win this honor in as many years. Honorable mention was given to the essays by Richard Arimizu, Hilo, Hawaii; H. Harold Kelley, 707 West Euclid avenue, Pittsburg, Kansas, and Viola Greene, Willimantic, Connecticut, R. F. D. No. 1.

The prize winning essay follows:

The Relation of Improved Highways to Rural Home Life

By John Liska

Isolation is the primary cause of the ignorance so evident in rural communities. Poor roads, more than anything else, have forced the farm home into a demoralizing isolation. The improvement of highways, making the consolidated school and social center possible, is injecting new life into homes formerly hopelessly isolated. Home life is broadened and enriched. Boys are willing to stay "down on the farm." Girls cease to envy their city cousing and to leave home for "the bright lights."

Just a few minutes of travel on a particular road leading out of the city of Wisconsin Rapids will convince the most doubtful skeptic of the value of good roads and their influence upon home life. About two miles from the city this road branches. One branch is called "the left road"; the other "the right road." The left road is almost always in a deplorable condition; the right road is hard surfaced. The homes on the left road are dilapidated, the front yards scarcely recognizable among the tangle of broken machinery, old wire, and various other objects placed "out of the way." The land has been cropped till it is impossible for even quack grass to flourish. The stock, descendants of some of Granddad's scrubs, is now so degenerated that scarcely any characteristics

of a high-producing, profitable animal are evident.

Can you expect the boy or girl to remain "down on the farm" under these conditions? Not one boy or girl living on this road has any education above the eighth grade, and very many have not even completed the eighth grade. These young people, many of them lying about their ages, have had to seek a "job" at the store, mill or factory, instead of completing their education. Can home life be pleasant and happy where these conditions exist?

The road to the right leads through land slightly more fertile, but more fertile only as a result of better farm management. No farm home on this road, for a distance of twenty miles, is without at least one modern convenience. Several farms are equipped with every modern convenience, both in and out of the home.

The aesthetic influence a good road exerts is very evident. Often it stimulates latent self-respect into practical expression. These people are continually adding some improvement in an honest attempt to beautify their home surroundings. Through diversification and rotation of crops they have succeeded in bringing their land to a high degree of fertility, resulting in a more stable income each year. They are sending their children to high schools, agricultural schools and universities. A better education is teaching these children to realize the value of a true home.

Before the right road was improved, conditions were alike on both branches. The improved highway alone made diversified farming profitable, made a better education possible and better homes a reality.

On the left road the average farmer has, in a large measure, lost his self-respect and has allowed his home to fall below the standard and has failed to keep in stride with the times. He is considered inferior to city people. Farmers, such as those on the right road, are again placing the farm home upon the pinnacle where it should rest, "The True Home of Man."

How necessary to that home is a good road! What a relief it must have been to those simple folk in Whittier's "Snowbound" to have the road opened and the floundering carrer bring the village paper to the door!

The left road may be compared to the snow-bound road, impeding progress, forcing isolation. The right road may be compared to the opened road, offering new opportunities, new possibilities and new happiness.

The right road is, in the true sense of the word, the "right road." We must build more of them. Until this is accomplished, home life in isolated sections will, in the future, simply exist; but when all roads are right roads, these same communities, those same homes, will live.

Increase Passed on By Gasoline Dealers

As was to be expected producers of gasoline seem to have decided to pass on to the consumer the recent increase in the state tax on gasoline. This is evident from the fact that since the increase was first talked of gas has advanced on the local market a total of three cents, which is three times the extra tax imposed at the last sessions of the legislature.

It will be remembered that along about the first of the year gasoline was selling in Salt Lake at 23 cents. A few days later it went to 24 cents and still later the price was announced as 25 cents. This continued until Wednesday when a new price of 26 cents was announced. The advance, of course, is attributed to an alleged shortage; but it is felt by many consumers just the same that it is no more nor less than an attempt to shift the burden of building state roads on to the man who has contracted the habit of running an automobile and finds he cannot well get along without it. Thus the profits of producer are not

affected.

But the thing that occasions anxiety on the part of the consumer is why prices of such commodities are not officially regulated and controlled. The public utilities commission was created for the purpose of holding in check any attempt on the part of public utilities corpora-tions to charge more for their product than a price consistent with a legitimate This applies to electric power, manufactured gas, railroad fares, telephones, etc., but does not extend to gasoline, coal and other equally important and necessary products. These latter commodities, it would seem, are just as indispensable to the public welfare as are those held in control, yet state officials appear to be without authority to impose protective regulations. True, attempts have been made here and in other states to inquire into price fluctuations, but in few cases has anything substantial come out of it.

The federal government seems to be as helpless in the matter as are the states. Both have ordered investigations on various occasions but aside from forcing a reduction for a short period, very little has been accomplished. It would appear that the public is entitled to the same protection in these matters as it is supposed to get in the use of products regarded as purely public utilities.—Desert News.

Once you have mastered the art of small talk, you do not need an automobile to run down your neighbors.

Road Work Should Keep Pace With Development

A bad road can spoil the best scenic trip and so it is that George Goodwin, chief engineer of the national park service, offers sound advice to the people of Utah when he stresses the necessity of having road work keep pace with the development of the scenic regions of the There may have been a time when good roads were considered more or less of a luxury, but this was before the advent of the automobile, when people spent their weekends at home and their holidays at the ball games.

Good roads are now regarded as the first asset of the growing state, having become a necessity in commercial and industrial development, in addition to affording the pleasures of travel in the open country. Good roads, however, cost money and the burden falls heavily on sparsely settled territories. Still it is to be remembered that good roads today make population just as railroads pre-ceded the tide of migration in the days

of the frontier.

Accessibility is the first demand of the modern settler, and so it is that Utah, in common with other western states, must expect to build and maintain roads, if it hopes to make the most of the vast stretches of idle land to be found within her borders. One of the difficulties in the past has been that we have not had the most out of our roads. Costs in some cases were excessive and in others the result was disappointing. Efficient road building will have the general sup-

port of the taxpayers. When the governmental machinery returns good roads in the full measure of the tax collection, there is little criticism. Criticism comes when road money is frittered away or when the burden of construction is unduly placed. Utah, no doubt, will build and maintain roads to the scenic sections of the south in the measure of tourist patronage and local needs. Our people realize that bad roads can blacken the reputation of the state with tourists, as well as deny our own residents the full joy of Utah travel.—

Salt Lake Telegram.

State Acquires Gravel Pit in Piute Canyon

Surfacing of the Richfield-Elsinore project and other projects in Sevier county will be obtained from the new state pit on the branch line of the D. & R. G. W. railroad about three miles north of Marysvale. A very satisfactory material for gravel surfacing is found there in great quantities. The contractors on the Richfield-Elsinore project are putting up a screening plant at the pit sixty feet above the spur track and will construct a three-rail gravity tramway from pit to railroad for delivery of surfacing material in cars.

WHEN ROADS WERE BAD

Back in 1890 in the wee hours of the morn, the suburbanite got off the train at the home station. Going to the tele-graph office he sent this message:

"Will not be at the office today. Am

not home yesterday yet."



SPARKS from the Road Drag

Struck Both Ways

The plaintiff was sueing a taxi company for negligence on the part of one of the drivers. The case was going much against the company, and it was clear to all that the evidence of the plaintiff had favorably impressed the judge and jury. This did not improve the temper of the counsel for the defendant and when cross examining he waxed sarcastic.

"As a matter of fact," he said sardonically, donically, "you were nearly scared to death and you don't know whether it was a taxi or something resembling a taxi that hit you."

"May I say then," the plaintiff replied calmly, "that I was forcibly struck by the resemblance?"

Thoughtless

Two men, renowned for their laziness, were shuffling along in a timber yard. The foreman asked them where they were going.

"Just takin' this plank up to the mill,"

answered one of them.
"Plank!" said the foreman. "I don't

see any plank."

Whereat both men glanced down at their hands, then over their shoulders,

and finally at each other's faces.

"Blowed if we ain't gone and forgotten the plank!" said the spokesman.

Not Guilty
Mandy—"Mose, is yo' sho' yo' didn't
marry me fo' mah job?"
Mose—"Co'se ah didn't, gal! Lawsy,
no! Yo' jes go ahaid an' keep yo' ol'
job!"

Too Small a Bribe Lady Guest—"Little Clarice, I'll give

you a penny if you will kiss me."
Clarice—"No, thank you; I can make more than that by taking cod liver oil." -Exchange Spark.

Hard on the Road

Mrs. Jones: Willie Jones?" "Tommy, have you seen

Tommy: "Yes, mam, and the steam

roller man is raising cain."

Mrs. Jones: "And why is he raising

cain?" Tommy: "The steam roller just ran

over Willie and some marbles he had in his pocket dented the new road.'

Next!

Skis: "Did you know that they have a machine now that can tell when you're lying?"

"Huh! I married one of Skeesix: them."

Damages and Repairs

A negro woman of mammoth proportions and inky complexion was in an automobile accident. She was taken to the hospital, where she soon regained consciousness. The doctor, seeking to comfort her a bit, said to her:

"You will undoubtedly be able to obtain a considerable amount of damages,

Mrs. Johnson."
"Damages!" said Mrs. Johnson. "What
Ah want wif damages? As got enough damages now. What Ah wants is repairs.

In the days before the radio, Before the moving picture show, Before the auto came along, Before the law made drinking wrong, Before the age of problem plays, Before the crossword puzzle craze When all these things we were without, What did we ever talk about?—Life.

The Union Forever Yankee Abroad—"I just bought a Rembrandt."

Patriotic American—"Well, American cars are good enough for me!"—Judge.

Takes a Month Off

I came to Salt Lake last month and purchased a grocery store and home; and, as I have always been a cow-puncher, I cannot confine myself indoors. I have a dandy business, but like the outdoor life; therefore, a bargain. Apply at the store, 1792, So. State.—Salt Lake Tribune.

That indefinable thing we call charm is what enables a girl to violate the traffic rules day after day with absolute impunity.

Page the Porter

"Mother, did daddy's name used to be Pullman?

'No, dearie; why do you ask?"

"Well, I just wondered; I see that name on most of his towels."

Rounding It Out

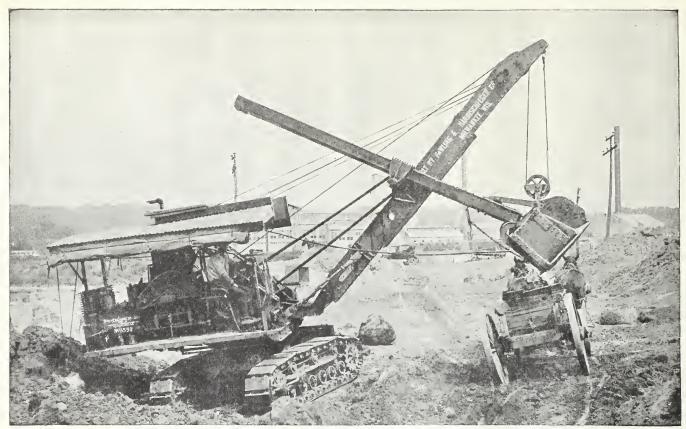
"Sir," said the beggar plaintively, "the good Lord gave me a stomach."
"Well, what of that?" demanded the

passer-by sourly.
"Wouldn't you like to round out his gift?"

New Year's Wish

Jones—"Oh, he's not such a bad chap. At any rate, he throws himself into any job he undertakes."

Brown-"I wish he'd go and dig a



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manual effort. The weight is properly distributed and the construction balanced.

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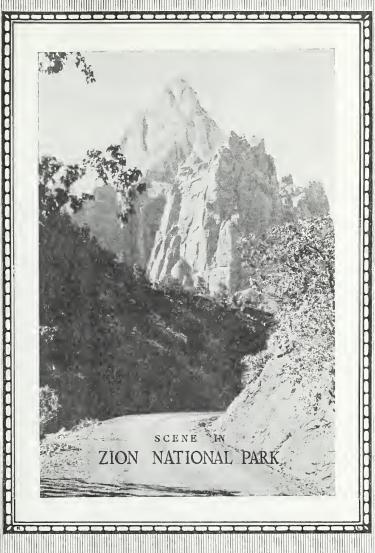
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Salt Lake City, Utah



GASOLINE SHOVEL



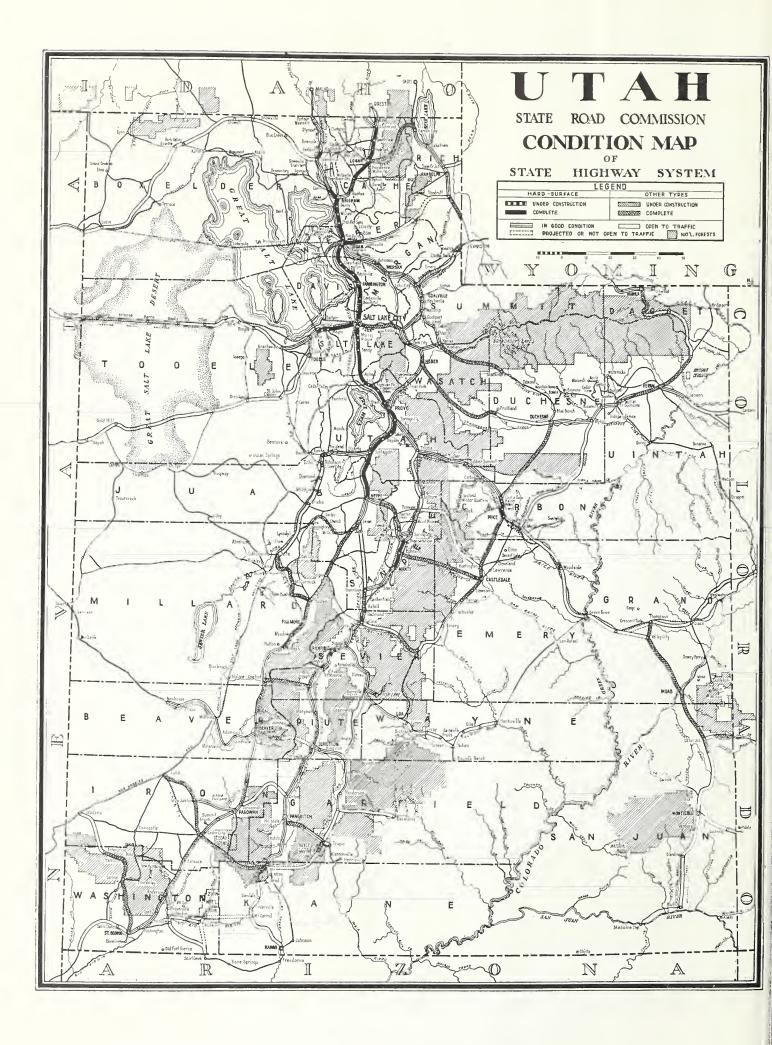






Vol. 2 MAY/ No. 7







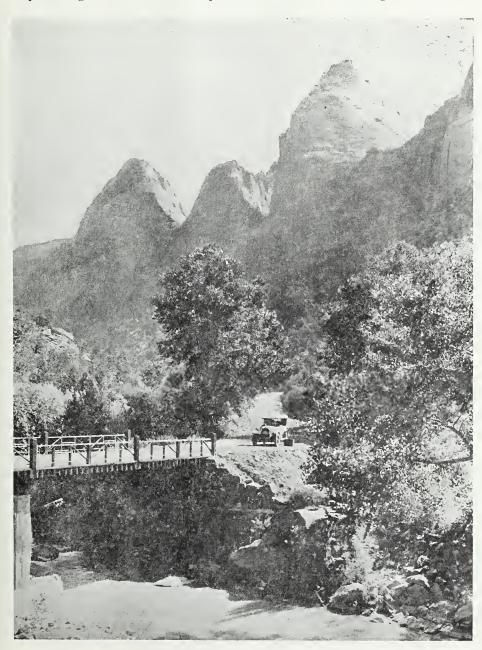
Volume 2

MAY, 1925

Number 7

Scenic Highways of Southern Utah

Road news is always good news when several million motor vehicles are constantly seeking new worlds to conquer. And such tidings of improved routes becomes momentous when the new arteries of travel link together scenic fea-



The Three Wise Men-Zion National park.

tures of surpassing splendor. Such are the attractions which Southern Utah offers to the motoring public this summer —good roads, new hotels and better camping facilities, the colorful sculpturing of Bryce canyon and Cedar breaks. and the towering cliffs in the fairy land of Zion park—that "Yosemite done in oils." A justly ebullent press describes the grand opening at Zion park the fif-teenth of this month with Governor George H. Dern and other officials participating in the celebration beginning at Cedar City and ending with the formal opening at the park entrance. For not only are these national play grounds, Zion park, Cedar Breaks and Bryce canyon new, scarcely known even to residents of Utah five years ago, but they are truly beautiful places and the scenery is surprisingly "different." Now a vigorous campaign of road building on the part of four counties, the state and the National government have made accessible these long unknown scenic splendors. Highway improvement in this region has interested a great railroad in further development of these scenic resources. During the past two years the Union Pacific has been engaged in constructing excellent rail facilities including a thirtythree mile branch to Cedar City, the gateway to the scenic region of South-west Utah, a \$300,000 hotel, "El Esca-lante" at Cedar City and at the mountain resorts center lodges and tourist accommodations unexcelled in any of the country's national parks. In addition to the lodge at the base of The Great White Throne in Zion canyon finished this spring, the railroad is adding to the camp facilities at Bryce canyon and the Utah Parks company is installing auto-stage passenger service between Cedar City and the three scenic points, the fleet to consist of 40 auto-stages of special design. To house and maintain this equipment a large garage is now in course of erection at Cedar City.

A \$2,000,000 Road Program Nearing Completion

Since the beginning of federal aid in highway construction, national, state and local road building units together with the forest service and the national parks service have expended nearly \$1,900,000 for good roads in this region, by the end of the 1925 construction season the total

cost of road development will approach \$2,200,000.

The federal aid projects completed are:

	Length	
Project	Miles	Cost
Buckhorn Flat	9.48	\$ 68,521
Coal Creek Bridge	19	29,249
Cedar City-Kanarra	12.03	110,427
Lund-Cedar City	33.29	334,299
Ash Creek-Anderson's	s 725	149,439
Anderson's-Toquervill	e 2.83	34,886

The following projects are now nearing completion in Washington county:

Lengtn	
Miles	Cost
8.65	\$140,727
.04	28,953
.03	15,363
	Miles 8.65 04

The following projects are scheduled for completion during the present season:

Length

Project	Miles	Cost
Parowan-Winn Holle	ow 9.61	125,000
Cedar City Paving	1.13	75,000

The above projects make a grand total of improvement with federal aid in this region of 84.53 miles at a cost of \$1,111,865. In addition the following improvements are to be credited to the counties and the forest service:

	Length	
Project	Miles	Cost
Bryce Canyon	4.00	\$ 22,230
Red Canyon		119,152
Circleville Canyon	4.00	66,793
Cedar-Long Valley		382,718
Sevier-Summit	14.00	150,011

A total of 74 miles at a cost of \$740,-904. Approximately \$60,000 more will be expended by the forest service during 1925 in widening and surfacing the Cedar-Long Valley road. Expenditures by the Parks service in and adjacent to Zion canyon will aggregate \$225,000 by the close of the season.

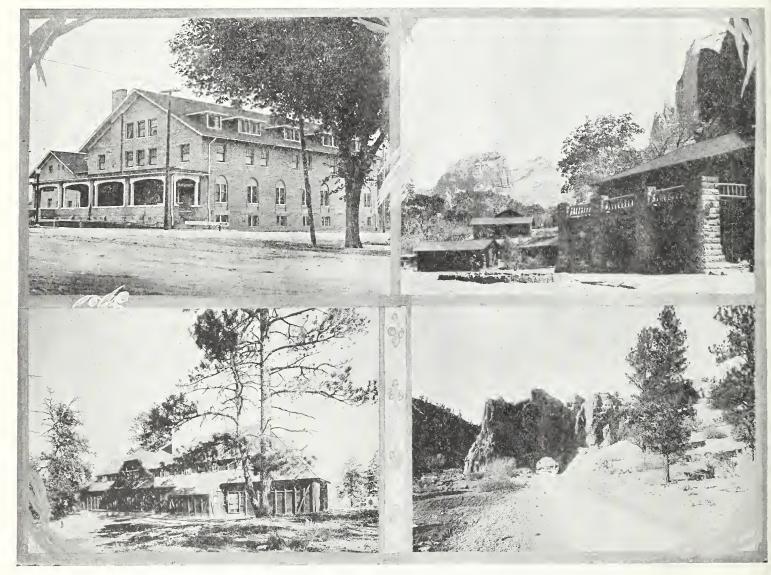
Adding not a little to the pleasure of a motor trip to Utah and her parks are the newly improved routes from Evanston, Wyoming to Salt Lake City, from Wendover on the new gravel road across the Great Salt Lake desert and the notable improvements over the 318 miles of the Zion Park highway between Salt Lake City and St. George, near the Arizona line.

Distances

Salt Lake City, noted for its beauty from its earliest history, and itself in a fascinating region, is 410 miles both from Yellowstone National park and from the north rim of the Grand canyon of the Colorado. From it in fact the motor lines to national parks branch out in every direction making the city indeed the "Center of Scenic America." Excellent tourist accommodations including municipal auto camp grounds are offered at Salt Lake City and at almost every town in Utah. It is 263 miles from Salt Lake to Cedar City from which point to the parks the distances are:

T_0	Cedar Breaks24	miles
To	Zion Park65	miles
To	Bryce's Canyon85	miles

From Cedar City to Los Angeles is 581 miles. On the California route, while it is but 55 miles from Cedar City to St. George the metropolis of Washington county and Utah's "Dixie" land the difference in elevation is nearly three thousand feet, the altitude of Cedar City being 5750 and at St. George but 2800 feet, in much the lowest valley in Utah. Here the climate and verdure is semi-tropical, a pleasing contrast after travel over mountain and plain. Rose gardens, the vine and the fig tree and the pomegranate flourish abundantly and the snowy white Mormon temple gleams from afar as one approaches the city.



Above—El Escalante hotel at Cedar City and the new center lodge in Zion park. Below—Center lodge at Bryce canyon and the Red Canyon highway to Bryce's.

Wendover Road Open to Traffic June 13th

The most serious obstacle to the completion of a transcontinental route between New York and San Francisco will become history when Secretary of Agriculture William M. Jardine "turns on the travel" over the Wendover road June 13. A special train carrying the secretary, Thos. H. McDonald, chief of the bureau of public roads, officials from Utah and neighboring states and a general delegation of road enthusiasts will be run to Salduro where the ceremony is to take place.

Forty-one miles of road, perfectly level and on a straight line for nearly the entire distance, bridges the salt beds and mud flats of the Great Salt Lake desert. For the ten years or more since the interstate travel assumed important proportions across the Mountain States four well defined transcontinental routes have carried traffic westerly to Salt Lake City only to be halted there and obliged to take wide detours to the north or south in order to avoid the forty miles of bottomless mud which lay across the direct route to San Francisco. Aside from its unique construction features the storm which broke when the state decided to place this project on the federal aid system attracted national attention and not a little "mud" was slung which equalled in consistency any of that found on the Wendover flats. Of the 170,000 miles of highway in the federal aid system this was the only road on which the Secretary of Agriculture held a hearing before making his decision. In short, the efforts of three state administrations over the

ten year period and of engineers and contractors for nearly two years will be crowned with success in June. A safe highway crosses this most forbidding desert stretch on an embankment 24 feet wide and which carries an 8 inch gravel strip 18 feet wide. Traffic will be held to the road over the entire distance except across the 6 miles of salt beds near the western side where vehicles may descend from the embankment and "step on it" over the salt in fair weather. The road closely parallels the Western Pacific and water is available every ten miles from the railroad stations.

The finished road will cost \$390,000 which is at a rate of \$9500 per mile, a remarkably low figure considering the extraordinary difficulties attending its construction. Acknowledgments are due the organizations and citizens of northern California who made possible the completion of the project by a contribution of \$50,000 and also to the Western Pacific Railroad for the very low rate at which it delivered gravel for surfacing the project.

Representatives from four western states as well as men of national prominence will take part in the road's dedication.

Ross Beason, chairman of the Salt Lake Chamber of Commerce committee which is making arrangements for the celebration, will be master of ceremonies. Secretary Jardine will deliver the address of the day in addition to which a short address will be made by the following:

Governor George H. Dern, Utah; Gov-

ernor Friend W. Richardson, California; Governor J. G. Scrugham, Nevada; Governor Nellie Tayloe Ross, Wyoming; former Governor Charles R. Mabey of Utah, W. H. Goodin of Lovelocks, Nev., president of the Overland Trail club of Nevada and Preston G. Peterson, chairman of the Utah state road commission.

Special invitations to attend the celebration will be extended to the following: United States Commissioner William Spry, Frederick H. Meyer, San Francisco chamber of commerce; Harvey Toy of San Francisco, chairman of the California state highway commission; the highway commissions of Utah, Nevada, California and Wyoming; the Down-town club of San Francisco; President C. M. Levey of the Western Pacific railroad; Vice President E. W. Mason of the Western Pacific railroad; J. W. Williams, H. K. Fay and Bodie K. Smith, all of the Western Pacific railroad; J. M. Lockhart, Arthur Smith, George Doyle and Vail M. Pittman, all of Ely, Nev., and to the chambers of commerce of the following cities: Ely, Reno and Elko, Nev., Ogden and Provo, Utah. United States congressman and senators from Utah and Nevada, the county commission of Tooele county and Randall L. Jones of Cedar City will also receive special invitations.

Condensed from Collier's, The National Weekly, by

EARL C. REEVES, in Readers' Digest Rome sat upon her seven hills and ruled the world over her highways. In the wilds of Macedonia their ruins may be found. In England J have driven over them, resurfaced with modern materials. A marvelous system for that age, but they took centuries of building. Uncle Sam is building 11 Appian Ways of solid concrete this year.

In the comparatively recent days when the whip was the only accelerator most of us knew, a "best road" cost the country around \$1,500 to \$2,000 a mile to build. A mile of the 1924 de luxe highway costs \$45,000. The statistician says commercial trucks average 47-mile trips; while the farmer now drives 18 miles to market his produce, instead of five or six. In the United States there are now more than 1,6000,000 trucks, and a full three quarters of them started hammering our roads to pieces in the last six years. We are spending four and a half billions on operation of motor vehiclescars and trucks—this year. Four years of civil war during the sixties cost us just that.

Here we have one of the greatest material changes taking place within a period of 20 years in all the history of the world.



Near Little Cottonwood canyon-Salt Lake county.

Pretty Smooth

Maiden Lady (to druggist)—Is your cold cream good for wrinkles?

Druggist—Madam, it would take the wrinkles out of corrugated iron.—Engineer's Bulletin.

Western Conference on United States Highways at San Francisco

Highway officials of eleven western states will meet at San Francisco, May 15, to designate the important interstate roads in these states to be uniformly marked as United States highways. The meeting is the outcome of the initial conference of the Joint Board on Interstate highways, composed of state and federal highway officials, held at Washington, April 20 and 21. It is the first of a series of regional meetings to be held during May and June at San Francisco, Kansas City, Chicago, Atlanta, New York, and Boston for the purpose of selecting the important interstate roads to be known as United States high-

The selected routes will be designated by number and marked uniformly in all states with a standard marker. As a basis for the selection of the routes, each state highway department will present at the meeting a map showing the routes within the state which, in the opinion of the department, should be selected. Officials of the state highway departments of Washington, Oregon, California, Nevada, Idaho, Montana, Wyoming, Utah, New Mexico, Arizona and Colorado will be present at the meeting. Preston G. Peterson, chairman of the Utah state Preston G. road commission is also a member of the federal joint board whose initial meeting was held in Washington April 20. Other members of the Western Regional conference who are also members of the federal joint board are the state highway engineers of Oregon, California and New Mexico.

The proposal to designate important interstate roads and mark them uniformly was initiated by the American Association of State Highway Officials at the annual meeting of the association at San Francisco in November, 1924, when the Secretary of Agriculture was asked to name a joint board to consider the mat-

There has been a feeling among highway officials for some time that a remedy should be found for the present confused situation in respect to interstate roads. Information was presented at the recent meeting of the joint board at Washington showing that overlapping of named routes is common. There are few of such routes that are not coincident in part with other routes. One well known route 1500 miles long overlaps other routes for 70 per cent of its length. Ten different routes are involved in this overlapping and in places two or three of

them coincide for many miles. At the regional meetings tentative proposals with respect to the form and color of warning and directional signs for interstate roads will be presented to the state highway officials for consideration. It has been tentatively decided to adopt a standard round sign for marking all railroad crossings and an octagonal sign to indicate danger or stop, a diamond shaped sign for caution or slow, a square sign to indicate "look" or attention, and

a rectangular shape for directional or informational signs.

Recommendations with regard to the standardization of highway signs have been made recently by a number of national organizations, including the American Association of State Highway Officials, the Hoover Street and Highway Safety conference, the sectional committee on color code for highway signs of the American Engineering Standards committee, the National Safety Council, the United States Bureau of Sandards, and the National Research Council. As a result of the work of the joint board on interstate highways in cooperation with the state highway departments, it is anticipated that a practical scheme, taking into account all such recommendations, will be evolved in the near future, and applied at least to the designated important interstate highways.

At the Washington meeting of joint federal board, after a discussion extending over two days it was agreed to discourage new trail organizations and to limit so far as practicable the further signing of roads by existing trail organizations. The resolutions covering the points agreed are substantially as fol-

1. That a uniform system of through route marking be adopted, based on num-

2. That resolution No. 5 regarding trail marking as adopted by the American Association of State Highway Officials at its last annual meeting in San Francisco, be adopted as the policy of this board. Resolution No. 5 is as follows: adopted the report of the subcommittee on traffic control and safety, recommending the immediate selection of transcontinental and interstate routes from the federal aid road system, said roads to be continuously designated by means of standard highway marking signs and protected by standard traffic warning signs;

WHEREAS, This system of highways when established and marked will satisfy the demand for marked routes on the part of transcontinental and interstate traffic, thus meeting the need which has been met in the past in a measure by the marked trails established by the reput-

able trails associations; and

Whereas, Many individuals have sought to capitalize the popular demand for interstate or cross-country routes by organizing trails, collecting large sums of money from our citizens and giving practically no service in return, with resulting discredit to the reputable trails associations which have heretofore rendered distinct public service by stimulating highway improvement, maintenance, and marketing; now, therefore be it

RESOLVED, That this association hereby recommends to the several states that the reputable trails associations now existing be permitted to continue their markings during their period of usefulness, pending the establishing of the proposed marking system, unless such action shall conflict with the marking systems and policies now in force in the several states; and be it further

RESOLVED, That no trail association be permitted to establish further routes on state or federal aid routes; and be it

further

RESOLVED, That we hereby warn the citizens of this nation to investigate carefully the responsibility of trails organizers and demand convincing evidence insuring proper expenditure of funds before contributing to or otherwise supporting such agencies.

3. That each state in the Union be requested to submit for the consideration of this board a design for a marker of national significance to be acted upon by

the board at a later date.

4. That each state where authority does not exist, ask its legislative body to grant authority to the State Highway department to provide a uniform system of marking and signing for the roads

now under state jurisdiction.

5. That the chairman of this joint board be asked to group the severel states in such manner as will best promote the study of the roads to be selected and marked under the supervision of this board; that group meetings be held at which representatives from each of the states involved and from the Bureau of Public Roads be present, at which meeting or subsequent meeting a study of the proposed routes to be selected and marked in each state be made; that joint meetings of related groups be held when necessary; that these groups report their recommendations to this board for review, adjustment and ultimate adoption.

6. That it be the sense of this board that in laying out the highways to recommend for adoption as part of the proposed uniformly marked system of interstate highways, each state be requested to bear in mind the following purposes:

a. The connection of important centers with those reasonably direct lines which will be improved at the earliest

possible date.

b. The dispersion of traffic over a sufficient number of alternate routes to promote safety and ease of maintenance.

c. The selection of approximately 1 per cent or less of the total highway mileage of the state as of greatest importance; of a second 1 per cent approximately as of secondary importance; and a third 1 per cent approximately as of tertiary importance; and that these suggested percentages be increased in sparsely settled states.

7. That it is the sense of this board to adopt as a preliminary and tentative standard for the interstate highways to be selected, the following color scheme: For all route markers and directional signs black lettering on white background; for all warning or caution signs black lettering on lemon yellow background and that this tentative recommendation be submitted to each of the states for their comments and recommendations before being finally adopted by

this joint board.

8. Since there has previously been adopted a resolution, except as to the use of lemon yellow as a color, it is the sense of this board that the recommendations of the subcommittee on Traffic Contral and Safety as adopted by the American Association of State Highway Officials at its last meeting, be adopted as the preliminary standards for traffic warning signs to be used by this body. These resolutions provided shapes for non-luminous signs as follows:
1. Railroad warning sign—Round.

2. Danger or Stop sign-Octagonal.. 3. Caution or Slow sign-Diamond

Shaped.

4. Look or Attention sign—Square.5. Road markers—some characteristic or conventional shape different from the above.

6. Directional and Information sign-Rectangular.

Not How Good But How Much?

Save in the more populous urban regions of the Western states, the pressing demand of the moment is for the construction of the greatest possible mileage of highways at the least possible cost. The problem is not one peculiar to state, county or city or to any particular section. It is a common difficulty endemic to the entire Pacific Slope.



Gravel surface project south of Fillmore

This is a land of great distances. Trade centers are widely separated and pueblo and rancheria are often miles apart. For this condition the automobile is somewhat responsible. Its perfection and intensified usage has vastly increased the range of human contact. The 60 miles that constituted a day's voyage by motor a decade or two ago is quadrupled now. Motor transport is demanding more extensive highway improvement.
Unfortunately, however, funds to pro-

vide necessary improvements are restricted. The theoretically irrestible force of highway transport has met the practically immovable barrier of scant purses. The customary adjustment that must be

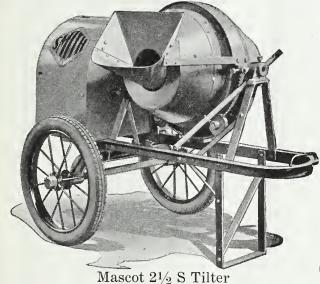
made when theory runs afoul of practice, therefore is requisite here. The resources available must be adapted to furnish a quantity rather than a quality highway service. A negation of idealistic engineering principles is involved. Our highway construction must rotate around the theme "Not how good, but how much" road can we build with the wherewithal at our command.

I bespeak therefore a more complaisant and serious consideration of the gravel road. The Western country is rich in material of a high value for road surfacing. Decomposed granite, caliche, quartz and limestone are in evidence everywhere. If we are to realize dollar for dollar returns on our highway investments, we must employ much more of this material in the future than we have in the past. The properly constructed gravel-surfaced road will carry a surprising volume of traffic at an astonishingly low maintenance cost and it is indicated for by far the greater mileage of our Western state and county road systems.—Western Highways Builder.

In Glowing Terms

Motor License Clerk: "But, madam, you will have to be identified before I can issue your driver's license.

Fair Applicant (blushing furiously): "Oh, I just hate to do it, and George would be dreadfully angry, but I have a love letter here which describes me fully, if you would care to see it."-New Hampshire Highways.



The Finest Small Mixer in the World at the Price of a Cheap Mixer

The Smith Mascot or $2\frac{1}{2}$ S mixer is ideal for the small job and repair contractor who expects to place 25 to 40 cu. yds. of concrete per day.

It is light enough to be drawn along the forms and small enough to be placed close to cellar windows for direct chuting of concrete for cellar floors and similar work.

It is a mixer of the same high grade, sturdy construction as the big Smith Tilters at a price for the contractor who is just starting.

Regularly Carried In Our Stock.

This Mixer has—

Smith Double Cone Tilting Drum A 1½ Horsepower Engine, Wico Magneto. Machine Cut Engine Gear and Pinion Chilled Thrust Rollers with Dust-proof Lubrication. Electric Steel Drum Pinion Discharge Operated from Both Sides All Steel Frame, Full Trussed Rear Axle

Write For Prices Or Come In And See It Work.



Published Monthly

OFFICIAL PUBLICATION OF THE STATE ROAD COMMISSION

•Volume 2

MAY, 1925

Number 7

STATE ROAD COMMISSION

Preston G. Peterson	Chairmar
Henry H. Blood	
Henry W. Lunt	
Agnes McNeil	
77 1 2 77	
Howard C. MeansChie	i Engineer

DEPARTMENTAL OFFICERS

H. S. Kerr	Assistant Chief Engineer
E. C. Knowlton	Assistant Engineer
E. S. Borgquist	Assistant Engineer
Levi Muir	Materials Engineer
W. G. Hayward	Office Engineer
F. S. Thompson	Chief Draftsman
Maurice Housecroft	Chief Bridge Draftsman
C. F. Dean	Chief Accountant

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H. V. RICHARDS, Editor

H. V. RICHARDS, Editor

ELIMINATING THE IRRESPONSIBLE BIDDER

In common with many other states Utah has experience with the kind of road contract where the work lags with distressing slowness and finally ceases altogether. We have fortunately been free from the type of "fly-by-night" individuals, reported from some other states, who grab up a contract on an unbalanced bid then do the work which pays handsomely, that is "milk the contract," and then disappear. Failures on Utah contracts have resulted either from lack of financial resources or from want of experience in highway work. It is easy to figure profits on paper and with the best intentions in the world a number of Utah citizens have embarked on the treacherous sea of highway contracting and lost heavily thereby, with the result that the state also and every user of the road shares in the disaster. The overhead costs to the state mount heavily when the work does not move as per schedule and the loss to citizens denied the use of the road for an unwonted period is such that a contract let at a much higher figure would have been cheaper in the end.

The action of the road commission, as reported elsewhere in this issue is designed to eliminate not only the irresponsible contractor but to prevent the presentation of bids at lettings by parties who are not fitted to properly carry on the work if awarded a contract. The requirements of financial standing and experience, evidence of which must be presented as a part of the proposal, are such that it will be most discouraging for any but a competent and desirable class of contractors to compete for road work in the future.

The executive committee of the local branch of the Associated Contractors of America has written the commission in regard to its recent action as follows:

"We note with satisfaction that the state road commission of Utah yesterday decided to 'examine more fully into the ability of contractors to complete road work they undertake for the state.'

"This association desires to commend the commission on the adoption of this policy. We believe that the contractor has a right to do all the public work he can secure as long as he can do it at the least possible cost to the state and without trouble to its officers due to irresponsibility. If the irresponsible contractor and surety agent are eleminated, the state road commission will have the benefit of receiving a larger number of bids from a more competent and desirable class of bidders.

"If the commission will now follow out the policy it has adopted and inquire into the ability, experience, equipment, financial condition and other essentials of the contractor before awarding the contract or even accepting the proposal, and at the same time question the surety agent concerned, the state of Utah will have the advantage of better roads at the minimum cost to the taxpayer. The defaults on road contracts in this state in the past have generally been due to the fact than an irresponsible contractor was performing the work, backed by an irresponsible surety bond agent.

"This association heartily indorses any plan or policy which guarantees jointly the rights of the state, its people and the contractor and others concerned in seeing that better highways are constructed by responsible contractors at the lowest possible cost."

BUILDING FOR THE FUTURE

This year in the forty-eight states of the Union something like 24,000 miles of highway will be constructed. Some work will be done in each of the states, while many will put through a tremendous program running into many hundreds of miles. To a larger extent than ever before, this gigantic road-building program will be along systematic lines, with a view to connecting up with what will be done in the years to come. Heretofore, or up until recent years, roadbuilding was largely hit or miss. Expediency was the incentive and roads were built under local units wherever a community could vision the future and issue bonds for construction. This resulted in patches of improved roads here and there, disconnected and often to the entire neglect of trunk lines. Now there is a prebuilding system, so that trunk lines are connected with feeder lines; objectives are known, and a road begins somewhere and ends somewhere. There has been great economy of construction in this systematizing, especially as to the cost of transporting material and equipment. When contracting jobs were broken up without regard to ultimate completion of a certain highway, the item of transportation of material and equipment figured high.

The west is forging ahead in its highway building, in spite of the dificulty of finances due to the lack of population. Everywhere permanency marks the construction.

While the present generation obtains direct benefits from highway construction, the future generations will be the chief beneficiaries, and, as far as that goes, have the major portion to pay for. Roadbuilding means bonds, and every bond issued means placing an obligation on future generations. As this generation enjoys progress of the past, it is willing to pay. If the present generation bonds the future, it is all the more an obligation that the present generation leave something permanent and worth the price. Highway construction is a heritage the future will not only approve when it comes to pay, but for which it will be grateful.

The federal government will serve the states this year with a several million dollar appropriation, thus helping to make possible the pretentious program about to be undertaken.

Highway construction should have in mind certain objectives, whether done by county, state or nation. Trunk lines should meet at county or state borders, with the view to continuous service. Each county should have its definite program, so that, as the years pass, a comprehensive, connected road system will emerge. One of the country's most noted highways was delayed and its benefits obstructed largely because this idea of a definite objective was overlooked; but today the Pacific highway stands as a sample of what roadbuilding means, when one may travel from Tijuana, Mexico, to Vancouver, B. C., continuously on a concrete paved highway —Salt Lake Tribune.

BOTH CLOSED

"So your neighbor Meek and his wife had a row over what kind of car they should get, he wanting an open car and she a sedan?"

"Oh, yes, but the incident is closed."

"So is the car. I saw her out in it this morning."

Status of Federal Aid Projects

By F. S. THOMPSON, Chief Draftsman

Projects Under Construction or Contract April 30, 1925

		Projects	Under Co	nst.	ruction o	i Coi	шас	l £	April 50, 1925			
No.	County	Na	me		Type	Lgtl	Per h. Con				Estimated Cost	
17-B Juab Chicken Cr 51-A Tooele Knolls-Wer 55-A-1 Washington Ash Creek 55-A-2 Washington Ash Creek 59 Davis Layton-Cle 60-A Summit Echo-Emon 63-A-1 Box Elder Chase-Bear 63-A-3 Box Elder Malad Riv			ron Co. Gridge field River City Bridge dal Veil Fa Pleasant inore oquerville Bridge Hill lard Co. ove Fort	Co.	Gravel Concrete Gravel Gravel Concrete Gravel Concrete Gravel Gravel Gravel Gravel Gravel Gravel Gravel Gravel Gravel	13.87 41.90 8.65 h 210 ft 4.11 11.0 5.09 e 100 ft. 3.37 12.04 4.98 5.53 2.83 e 150 ft. 0.5 5.8 2.1 35.33		40 Butler & O'Berto 99 Hawley, Anderson & 92 Kroft, Bundy, Zimme 73 Paxton, Dorrity & Bl 25 Whitney & Reynolds 50 Ryberg Bros. 39 Wasatch Grading Co. 99 Olaf Nelson 74 Jas. J. Burke & Co. 40 Inland Engr. & Cons 33 Hawley, Anderson & 70 Gray & Murdock 30 A. G. Young & Co. 98 Raleigh & Higbee 47 C. A. Kemp 90 Inland Engineering 10 Inland Engineering 10 Wheelwright Construt 10 C. F. Dinsmore & O		er & Lamus Black s c. Ast. Co. Thinckley Co. Co. Co. Co. uction Co.	\$ 52,948.20 93,686.67 379,396.49 140,727.42 28,953.66 141,000.68 153,288.73 80,385.19 17,763.08 52,862.19 85,823.99 55,782.12 57,506.28 34,886.04 15,363.10 8,852.60 40,456.08 21,151.10 249,597.72 54,226.29	
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engineer,	e that my mission, a	ping and im-				Plans	in th	ıe	Course of Preparation	on		
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Magazine.

Additional Contract Let on Wendover Highway

When the forty-one mile gravel road across the mud flats of the Great Salt lake desert between Wendover and Knolls is opened to traffic on the 13th of June another contract will be in full swing covering the entire distance of thirty-five miles between Knolls and Timpie. An Ogden firm, The Wheelwright Construction company, was the lowest of eleven bidders on tenders received April 29th, 1925 and has contracted to complete the job in 250 weather working days, which will mean completion of the work in time for next spring's traffic over the Wendover road. While this route has been closed to traffic since the Wendover-Knolls portion was placed under contract in December 1923, the new project will in no wise impede travel, being off the present road for the entire distance, and the existing road can be maintained in a manner that will enable it to carry this year's traffic.

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The total cost of the work, including all force account items, materials furnished by the State and ten percent for contingencies, engineering and inspection, is \$249,597 or about \$7,000 per mile, one thousand dollars less than the average cost per mile of gravel surface roads in Utah. The engineer's estimate was \$326,-464 or \$76,867 higher than the accepted bid. Based upon unit prices of the ten other bidders which included a number of firms outside the State the costs are as follows:

Gray and Murdock, Salt Lake City, \$319,962; Reynolds-Ely, Springville, Utah, \$293,789; Morrison-Knudson & Co., Utah, \$293,789; Morrison-Knudson & Co., Boise, Idaho, \$284,332; C. A. Robinson, Burley, Idaho, \$297,005; Maney Brothers, Oklahoma City, Oklahoma, \$287,246; Griffith, Mullins and Palm, Salt Lake City, \$313,928; Sumsion, Clyde, Thorne and Whiting, Springville, Utah, \$267,875; Mathews, Wrathall and Brown, Grantsville, Utah, \$405,118; Geo. K. Marsh, Spokane, Washington, \$289,973; Ora Bundy, Ogden, Utah, \$267,527.

Part of the work of preliminary engineering on all projects includes prospecting for and the testing of gravel pits by the Materials and Tests division of the Road Commission. The work of that de-partment on the Knolls-Timpie road has resulted in materially lowered costs for the work. The ground was thoroughly gone over and a number of pits yielding ample quantities of excellent road surfacing gravel located.

Geologically it is a region marked by deltas, dykes and shore lines resulting from the subsidence of the ancient lake

Bonneville and a study of these natural features facilitated the discovery of suitable and properly located material. An ample number of test pits were dug at each approved site and the gravel tested at the laboratory. All of these pits were noted on the plans, fully described in the specifications, and inspected by all bidders before submitting tenders for the

Another feature which will reduce the cost of the work to the State will be the compacting of the gravel surfacing by State force account. The road is in a region of very little rainfall and the project is unusually long. It was therefore decided that as the contractor placed the gravel on the road in the required amount and to the standard section, the State would immediately take over such portions and complete the shaping and compacting of the surface by force ac-count, relieving the contractor of the dubious item of surface finishing and the maintenance costs frequently connected therewith. This force account item will be completed at a cost of \$250 per mile, a much lower figure than could have been made by the contractor in keeping an organization on the work until the elements favored the final and finishing touches.

There are no structures of importance on the project with the exception of the proposed underpass of the Western Pa-cific tracks at Low which will be built later under a separate contract. From Timple the first four miles west will be through mud flats on which drag line construction similar to that on the Wend-over-Knolls project will be required. The principal contract items are 66,500 yards of excavation, 200,000 cubic yards of borrow, 71,600 cubic yards of gravel for surfacing and 189,100 yard miles of gravel haul. Elevation of the finished road will average about one and one-half feet above the ground surface.

A Modern Village

"Is Punkville much of a place?" in-

quired a passing tourist.

"Naw," replied the native of Nearville.

"Nothin' there but a garage an' a beauty shoppe."—American Legion Weekly.

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"Seeing Things"

By MELVIN A. TAYLOR, President, First National Bank of Chicago.

From an address given at the 49th Annual convention, American Bankers' association, Atlantic City, N. J.

Another group of our citizens, wise, cautious, and sane, who may be seeing things, are those who believe that the country is headed toward financial ruin through debt and taxation. No one will deny that these items are assuming staggering proportions, but when we examine the other side of the ledger, is the situation as bad as it appears?

Have we not forgotten the growth of the country?

Do we properly appreciate the change that has taken place from the forest and pasture of one hundred and fifty years ago to the agricultural supremacy of the last quarter of the nineteenth century, and again to the industrial achievement of the present day?

One hundred years ago government was a simple matter. The population was small and thinly scattered over great areas. The pioneer was busy subjugating the new lands, building homes, and bringing the natural resources of the country under his dominance.

The expense of administration then was small.

But as the population increased, as cities and towns were built, as the work of the pioneer was largely finished, and as great industrial centers grew up, the regulation and direction of our daily activities became more and more complex and government became an ever-increasing and expanding function and a consequent growing charge. Statistics are overwhelming as to the increase of our national wealth and national income. Our mounting debt may be tremendous, the taxes we pay may be burdensome, but is the debt out of proportion to our wealth and our ability to pay?

For what, after all, are our debts creat-

Those of us who have been taught prudence and caution in the matter of borrowing money usually say that a debt should not be assumed except for productive purposes, but if we will carefully analyze our own case we shall doubtless be forced to admit that some of our most satisfying possessions are those acquired through the purchase of non-productive property.

No one would maintain that a home is a liquid or remunerative asset, and yet it's the ownership of a vine, a fig tree, and a roof all our own that gives a sense of security and pride and a joy that nothing else can produce.

Home ownership is eloquently advocated as a panacea for many of the ills of the present day, and yet we know that this end can only be accomplished in any large way through the assumption of individual debt.

The one safe guide for the contraction of such a debt is the reasonable assurance of an income which will meet the charge of the loan and ultimately accomplish its liquidation.

If we can justify individual expenditures for non-productive purposes for the personal welfare of the individual, does it require any violent wrench of economics to find a warrant for the expenditure in behalf of the community for community welfare?

Excepting the war debt, which was gladly and willingly assumed by all, I think it is safe to say that a large part of new securities emitted in recent years has been of a municipal character.

Has the issue of these securities gone too far, and has the purpose for which the money has been expended justified the debt?

A writer recently contributed an article to a western paper entitled "What's Eatin' Us." He rightly, I think, attributed our panic of seeing things to a lack

of proper appreciation of the blessings we enjoy.

Among other things he said:

"To those who remember the time when \$40 an acre was considered an outrageous price for land in eastern Lowa, a spring seat on a farm wagon a luxury, and the possessor of a 'top buggy' a nabob; when there was scarcely a furnace or a bath tub in the entire state of Iowa; when the only refrigerators in town were those in the butcher shop; This Age when one only has to touch a button to get a light with the strength of a hundred candles; when you turn one faucet and get cold water and turn another and get that which is hot; when houses without bathrooms and furnaces are exceptions; when schoolhouses in small towns are better appointed than state capitols used to be; and country children are taken to and from school in auto busses, and city schoolhouses are not considered quite up-to-date unless equipped with a swimming pool; when workmen drive to their daily tasks in gas cars; and there are enough autos in the state of Iowa to take every man, waman, and child in the state out for a joy ride at the same time, it seems as though some genii had rubbed a modern Aladdin's lamp and that we are living in Fairyland.

The truth is that these things handed to the young people of today are the results of toil and thrift—the subjugation of a wilderness—by men and women, who asked only a chance to try their strength, and to the triumphs of science and the discovery of truth. To this pampered generation these facts, the toil, the sacrifice, the hardships and privations are unknown. The rich heritage is accepted as a matter of course—often without so much as a thank you, and frequently with complaint because there is not more."

If national life is to survive and be happy—and it will—the homes of the city, the town, and the country must shelter in pleasure and comfort a contented people.

This can only be done by capital investment that cannot be made, with rare exceptions, in one lump sum from accumulated savings.

Who of us now would willingly return to the conditions of fifty or one hundred years ago?

Much of our recent debt has been for good roads. In most parts of the country these cost in the neighborhood of \$25,000 per mile, but they add immediate increased value of \$10 to \$25 per acre to every foot of ground they traverse, and they certainly add increased dollars to every item produced on farms bordering or near them, to say nothing of the comfort and happiness which safe and easy traveling over them brings to the rural communities.

Would we stop building roads and would it be a good investment to do so?

As the writer just quoted says, borrowed money has gone into the erection and equipment of splendid school buildings in city, town and country. Would we like to go back to the little red school-



"The accomplishments of today—more and better roads—the subjugation of a wilderness."

house with one window, an oil lamp, a single blackboard, and a three-foot rule, which might be used for more than one purpose?

We would not, and we will not.

A very large sum has been and is being borrowed by the farmers of the country to pay existing debts, to purchase more land or to improve and equip the property which they already own.

Would we have it otherwise?

We don't hesitate to approve the borrowing of money by our customers, firms or corporations for the purpose of plant expansion and to meet the increasing



"Good roads increase land values and happiness to rural communities.

requirements of their growing business. We purchase and freely distribute the securities of our railroads and utilities for the construction of magnificient stations, terminal facilities, and business homes, many of which are in themselves decidedly non-productive.

We measure the soundness of these enterprises by the yardstick of an ample excess of value over debt incurred, and a satisfactory income, to provide with reasonable certainty, for the service and amortization of the loan.

If we applied the same yardstick to the municipal and farmer debt, which are causing many of our citizens such concern, is it not clearly and easily to be seen that these debts too, are equally justified and secured?

Most of our states have very salutary laws regulating the issuance of securities by the states themselves and the subdivisions thereof. These are based upon sound principles of ample property values and wise tax limitations.

The difficulty is that we cannot realize that each increase of a million population adds just so many units of additional demand for each foot of soil and homes for human existence. We are not willing to concede that the community is justified and should capitalize a part of that appreciated value for community welfare.

The farmer who borrows \$50 per acre upon his land is merely capitalizing a part of the value which has accrued to him through the ever-increasing demand of an increasing population for the purpose of contributing to his individual and family comfort.

There is, however, another element which robs this bogey of increasing debt

of much of its alarm for me; that is, that all of the securities issued are being purchased by our own people. We are simply borrowing from our neighbors and paying back to them. The increasing wealth of the nation is being spent in making the nation a better and happier place in which to live .

If we were impoverishing ourselves by the sale of our securities to others and the payment of large sums as a charge thereon to foreign people, we might well be disturbed. But the debt is our own and we in turn own it, and better still we are not borrowing to make these security investments. They are being made from accumulated earnings, from the savings of the people, and still are not absorbing all these savings are accumulations, as is witnessed by the constant increase in savings deposits amounting to more than 10 per cent annually, to say nothing of the tremendous increase in current bank balances.

We are rapidly becoming a nation of investors and property owners, and cry aloud as alarmists may, I do not believe you can make bolsheviks of such people.

No Trespassing

The wife and daughter of Col. Berry, camp commander, came up to the gate after taps and demanded admission. The sentry objected.

"But, my dear man, you don't understand," expostulated the older woman.
"We are the Berrys."

"I don't care if you're the cat's whis-kers," retorted the sentry, "you can't get in at this hour."—American Legion Weekly.

Tourist Travel

Tourist Travel follows the "Line of Least Resistance."

In Utah we need more good roads and must maintain the good roads we have.

Morrison-Merrill & Co.

"THE LUMBERMEN"



Highway Notes

Particularly good maintenance is noticeable in Parley's canyon this spring. The road is in most excellent condition and State Road Agent Wheeler of Salt Lake county is to be congratulated both on the present condition of the surface of this highway and the widening of same during the past year.

The four mile dugway between the summit and the junction of the Kamas road with the Heber to Park City highway is to be improved at once. This is the main highway for the people of Kamas and vicinity and has long needed attention. The Summit county commissioners have made a betterment appropriation but prior to starting work requested the road commission to detail an engineer to relocate this road. This work is now being done and the relocation will result in a much safer highway.

Wm. Osborn, resident engineer in charge of the Echo-Emory project now under construction, has also been superintending some location surveys in Echo and Weber canyons. The Echo canyon location, recently completed, had its initial point at Emory, the eastern terminal of the portion now under construction, and terminated at Wahsatch, a distance of 13.7 miles. Castle Rock station on the Union Pacific railroad is midway on the

project and the most important line change is in this vicinity. The present road crosses at grade the westbound main line and several side tracks at Castle Rock. The revised line eliminates three crossings by an underpass one-half mile east of the station. The work on this portion of project No. 60, will be much less expensive than the Echo-Emory section; the cost, aside from the underpass and reconstruction of the existing underpass west of Castle Rock for the East bound main line, being approximately \$12,000 per mile.

The location in Weber canyon is now being made. This line starts at the Ogden south city limits, extends from Washington Avenue to a point beyond the Country club, thence by a new location, via Uintah, to a junction with the present road near the mouth of the canyon. A number of interesting problems are now being worked out in connection with the routing of this line, the definite location of which at this writing, not having been determined.

A marked improvement has been noticed this spring in the condition of the roads in Grand county. Mr. C. E. Bailey was appointed State Road agent early in the year and immediately made plans for this spring's campaign. Grand county is traversed by north and south, and also an east and west highway, equally important. The north and south highway being of greater importance locally has been improved as a Federal Aid project. The east and west highway across the desert, from Green River to the Colorado line, near Mack, Colorado and also on the federal highway system, has been for years a decidedly second-class, unsur-faced road. Improvements are contemplated within the next two years that will result in this highway being the equal of Grand county's north and south highway of which all citizens of Grand and San Juan are loud in their praise.

Mr. Bailey was confronted with quite a problem in endeavoring to get this east and west road in such condition this spring as to make it a safer and faster road than it heretofore had been, his instructions having been to bring about this condition and to maintain the road in the best condition possible pending the time it could be reconstructed and surfaced.

How well Mr. Bailey has succeeded is evidenced now by the fact that cars frequently and with perfect safety can now negotiate the 125 miles between Grand Junction and Moab in five hours.

The new state road agent of Summit county, E. F. Robertson, has been busy with a force of men and teams together

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with one of the state's road rollers repairing damage done near the summit of the Salt Lake-Park City road following heavy traffic on the road in April when the subgrade was soft from melting This road was closed to traffic during the winter months and on three miles of the new grade between Gorgoza and the summit the bottom simply fell out in spots under traffic necessitating the closing of the road again for several days. Every effort will be made next winter to keep this road free from snow for the benefit of increasing traffic and to reduce as much as possible the high maintenance costs of early spring.

The state road commission has recently signed a cooperative agreement with the federal government covering the construction of twelve miles of road in Huntington canyon. With the completion of this section the Huntington-Fairview road will be open to traffic and a much lower summit crossing secured than that over the Ephraim-Orangeville road. Being open for several months longer out of the year the new road will be of great benefit to the citizens of Sanpete and Castle valleys. The cooperative agreement stipulates that \$30,000 will be supplied for construction of the road from section 8" forest funds and \$15,000 by the state. The state's portion of cost will be furnished entirely by Emery county. The award of contract and the superintendence of construction will be under the direction of the bureau of public roads from the Ogden office.

As a part of the proposal on all bids received the state road commission now requires that contractors submit evidence of financial ability to complete the work if awarded a contract, also a statement of experience in contract work, a list of equipment available and a certification from an approved surety company that it agrees to furnish the bidder the required bond. The financial statement must show first, the amount of cash available for the project and second, the value of personal property, real estate and other assets available as securities is possible to clean out the old deteriorat-

in effecting loans for use on the project, and, finally, a bank reference and the amount of credit such bank or banks is willing to extend for use on the project. The statement of experience is chiefly concerned with the contractor's ability to carry on the work in a business-like manner and to complete it on time.

Cement Gun Maintenance Unit

BY E. S. BORGQUIST Assistant Engineer

An unusual and useful piece of maintenance machinery recently purchased by the Utah State Road commission is the cement gun unit which was put to work

during the latter part of April.

The unit which is mounted on a 5-ton Class B Liberty truck, consists of an air compressor capable of furnishing 212 cu. ft. of air per minute at a pressure of 90 pounds, together with a cement gun of N-1 size. There is also a Crown air brush painting outfit for painting by compressed air, as well as a couple of jackhammers and other air drill tools.

The unique feature about the unit is that the compressor is driven directly from the truck engine thus making it unnecessary to haul another engine about with which to run the compressor. This is made possible by an auxiliary "jack-shaft" which may be thrown into gear while the truck engine is running in neutral. The compressor is belt driven from this envillence should

from this auxiliary shaft.

The compressor is large enough to furnish air for the full capacity of the N-1 cement gun, or for 2 jackhammers working at the same time. Due to the fact that the machine is portable, it may be taken to all parts of the state and put into use an any kind of maintenance work that needs to be done.

The cement gun proper is being used for concrete repair work on bridges and culverts. In Emery county and some of the southern counties, there are many concrete structures being badly eaten away by alkali. With the cement gun it



Park City-Salt Lake road at head of Parley's canyon.

ed concrete with the sand blast and ther to refill the holes with gunite which it self is about twice as dense as ordinary concrete and which should withstand the action of the alkali very much better.

With the compressed air painting out fit, it is planned to paint all of the stee bridges and timber bridges in the stat as well as to paint all of the guard rail of which there are a great many on ou federal aid projects, through our country

The jackhammer rock drills will b used wherever there is drilling to be don on maintenance operation, as in cutting out short sections of the concrete slal at high points. On the first job for the cement gun unit a row of holes 1 mil long with holes spaced 5 feet apart an drilled through an 8 inch concrete slal was finished in 41/2 days time of actua drilling time. This work was done of F. A. P. No. 59 and was necessary in or der to provide holes for the pins support ing the vertical center joint on the resurfacing work.

At present the unit is being used of painting of guard rails and with the ai brush a man is able to cover from 4 t 6 times as much surface as he could wit an ordinary paint brush besides bein able to get into crevises and corners muc more easily.

Altogether the new unit promises t be one of the most useful and successful pieces of maintenance equipment on th state road system.

Progress on the Moffa Tunnel

The Moffat tunnel which will pierce th continental divide on the route of th Victory highway in Colorado is nov about one-third completed. Construction began September 1923 and from th present rate of progress the tunnel wi be opened to traffic in 1928. The bor is 6.09 miles long and pierces James pea at an elevation of 9000 feet. Work i conducted simultaneously from both side and crews are now in over a mile from each portal. The method of construction requires that enlargement of the tunne to finished section, 16 feet wide and 2 feet high, continue at a rate that wil advance it not nearer than 2000 feet t the breast of the bore. Paralleling th main tunnel at a distance of 75 feet, pilot bore 8 feet by 8 feet is being drive as an aid to construction and which wi be used ultimately in transporting wate from the snows of the western slope t Denver. Although required primarily fo railroad use the line through the tunne is to be electrified and automobiles wil be taken through on flat cars of special design—a small toll charge to be levie for this service. Completion of the tun nel will mean an all-year motor road int Utah by way of Vernal and Duchesn on a route now closed by snows si months out of the year.

Unquestionably the man ahead wa drunk, so the officer gave chase and after some manipulation forced the ca

to the curb.

"What do you mean by driving a ca
in this condition?" he demanded.

"'S all right, Ossifer," the boiled on
replied, "I'm gonna have 'er overhaule
soon's I get sober."—Baltimore Sun.

Taking Ruts Out of Gravel Roads

After months of experimentation on roads in the southern part of the state the Indiana highway department has devised a method for taking ruts or corrugations out of gravel roads. A. H. Hinkle, maintenance superintendent of the highway commission, deserves the credit for the new method which already has been christened the Hinkle method.

Mr. Hinkle's plan is simple. In the main it consists chiefly of crushing gravel and stone so that it will pass through a 1-inch screen and then applying the dust with the screenings. He has found that by using the dust and following its application up by systematic maintenance, ruts are almost entire-

ly eliminated.

The plan has worked so well on the roads on which it has been tried that the Indiana highway department has adopted it for all gravel and stone roads. According to Mr. Hinkle, corrugations are formed in gravel roads when traffic reaches a certain density and are caused by the vibration of cars combined with the slipping or "kick back" of the drive wheel as it drops into the trough of the corrugation. It has been found that corrugation develops much faster after a rain because wate ris splashed out of the depression and carries with it gravel and sand.

These corrugations develop in all types of gravel roads, but seem to develop faster in gravels lacking cementing material and which are deficient in coarser pebbles. Gravels with an excess of fine silica sand and no cementing value cor-

rugate readily. For these reasons, Mr. Hinkle has succeeded in reducing the corrugation, as sai dbefore, by the addition of a thin coat of the crushed gravel passed through a 1-inch opening and containing all the dust incident to crushing. Crushed limestone of the same grade can be used in the same way. Roads made of limestone and maintained by the dragging process corrugate much less than the average gravel road. This is due to the fact that the limestone has a greater cementing value.

The use of a heavy drag is advocated by Mr. Hinkle to prevent the formations of corrugations. Such a drag or grader planes off the surface and does not vibrate as is the case with lighter equip-

Mr. Hinkle also has his workers drag a road just after it is given a surface treatment of bituminous material and clean stone chips. This innovation, started last summer, took out the irregularities often to be found, and proved so successful that other states are now dragging their surface treated roads, he said.—Successful Methods.

Call an Alienist

"Any insanity in the family?" asked the insurance doctor of Mrs. Suffragist. "Well, no—only my husband imagines

he is the head of the house."-The Cres-

Perfect Protection

Leaning over in a confiding manner Mildred whispered to her friend:

"Do you know Harry was wearing my picture over his heart in France and it

stopped a bullet?"
"Yes?" said her friend, surveying her.
"I'm not at all surprised."—Exchange.

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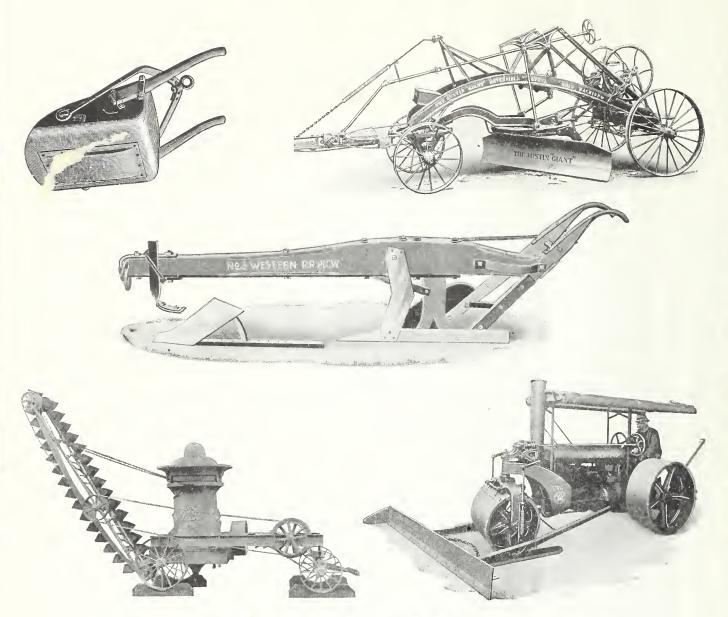
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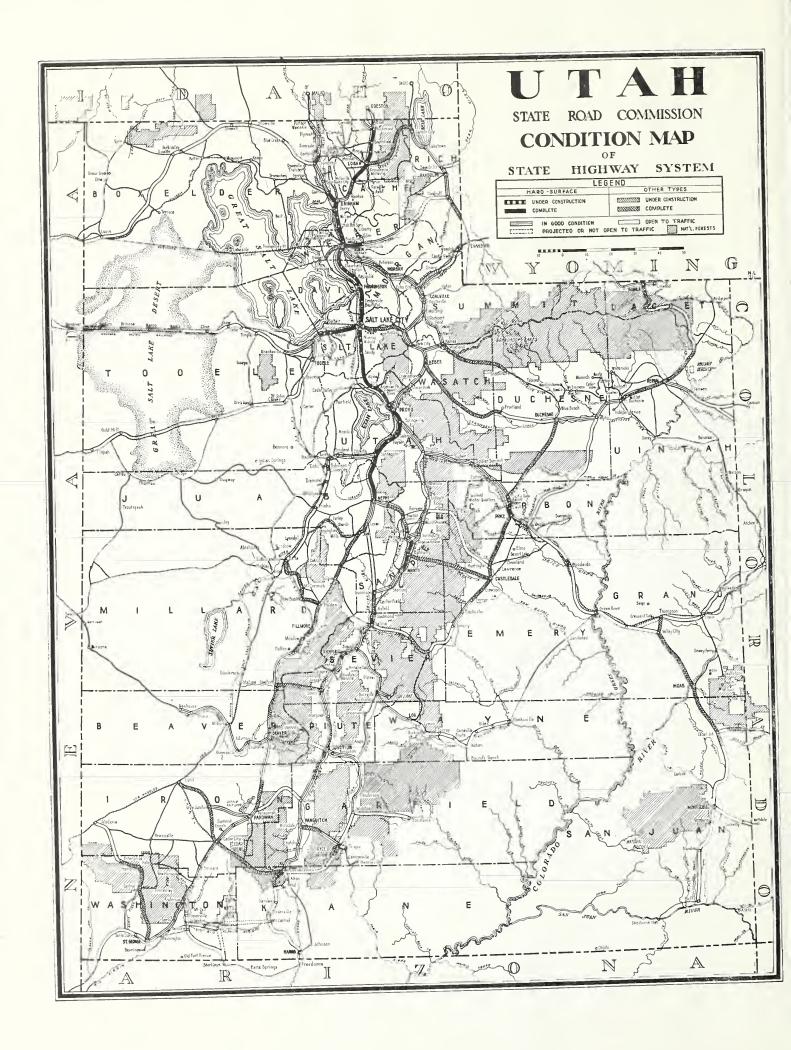


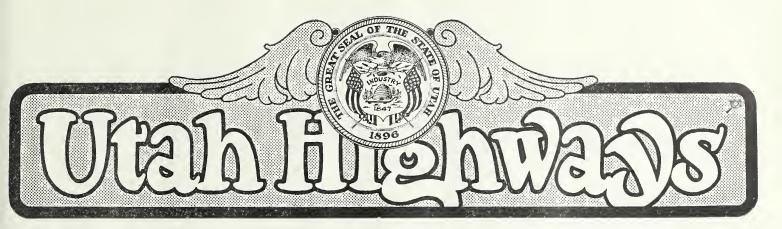




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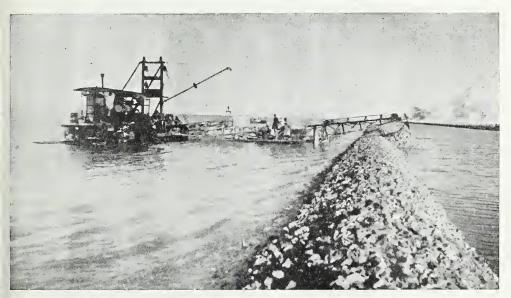
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JUNE, 1925

Number 8

Road Across Salt Desert Completed

The successful conclusion of the cooperative efforts of three states and the federal government was the subject of felicitous ceremony at Salduro, Saturday, June 13, when the new Wendover highway was officially opened to traffic. Initiating the construction of some noteworthy project by official hands heaving a shovelful of earth is a common enough procedure. The unique distinction ac-



How the job looked at the beginning, September, 1923.



The Victory Arch and Special Train at Salduro.

corded the completion of this direct route to the coast was the clearing of the final salt barrier from beneath the Victory arch by shovelers George H. Dern, governor of Utah; J. G. Scrugham, governor of Nevada, and W. M. Jardine, secretary of the United States department of agriculture. Brief addresses were made by these officials be-fore they cleared the way for traffic be-tween Utah and Nevada. Other speak-ers on the program were Thomas H. Mc-Donald, chief of the federal bureau of public roads; Charles R. Mabey, former governor of Utah; Senator Tasker L. Oddie, of Nevada; Harvey M. Toy, chairman of the California highway department, and Preston G. Peterson, chairman of the Utah state road commission. Some 400 other celebrants invaded the desert, the majority by special train over the Western Pacific, although a number of motorists took advantage of the occasion to drive the 123 miles from Salt Lake and enjoy the novelty of crossing the mud flats of the Great Salt Lake desert on a modern gravel surfaced highway. The fastest running time by auto was made by Al Jenkins, professional driver, who covered the distance in two hours and forty minutes, and beat the special train by eight minutes.

From Salduro it is ten miles to Wendover on the Utah-Nevada line and the western edge of the desert. From Wend-over the recently completed highway extends 41.9 miles east paralleling the 40-mile tangent of the Western Pacific and crossing in that distance what is probably the most inhospitable waste that the vicissitudes of mother earth have produced. The subsidence of the ancient lake Bonneville, of which Great Salt lake is the shrunken remnant left, in western Utah an alluvial deposit hundreds of feet in depth which receives the drainage of the surrounding area. These mud flats are never dry to more than four or five inches from the surface. During the dry season this treacherous footing is covered to the horizon with a yellow-ish-white incrustation. There being no outlet the flat is highly saline in character. Near the western side are the salt beds, six miles wide, running from a depth of a few inches at the edges to four feet thick at Salduro which is located near the center of the salt field. The salt extends for thirty miles north

and south. From October to May the mud flats and the salt are covered with water varying in depth from one to eighteen inches. Due to its salt content it does not freeze, and is blown about constantly by the high winds prevailing in

the region.

To bridge this gap in the New York-San Francisco highway with an enduring and safe automobile road was entirely too great an undertaking for Utah, with her resources already strained in the building of roads more immediately es-sential for local needs. The story of the building of the road will be briefly told but the thing of paramount importance is that it is now completed and open to traffic. As such it stands and will always remain, a monument to the soundness and the justice of the policy of granting federal funds to aid the states in the construction of roads. The project has cost \$390,000, of which the government's share is \$284,000. Citizens of California, through the Utah-Nevada-California Highway association, contributed \$50,000, Nevada agreeing that funds available from this source for the construction of the primary road across the two states be used first in Utah for the building of the Wendover cut-off. The Utah legislature appropriated \$25,000, the balance of the total cost, some \$21,-000 being made up from state funds remaining from projects completed under the old bond issues.

Other Sources of Assistance

Notwithstanding the efforts of state and bureau officials and the tri-state highway organization the road would still be unfinished but for the friendly services tendered by the Western Pacific in the reduced rates for gravel from its Dyke pit in Nevada, fourteen miles west of Wendover. In addition the presence of the railroad was of incalculable importance in the conveying of men and supplies along the forty miles of construction. Great praise is due the contractors who built the road, who matched their financial resources, energy and ability against unfavorable conditions and won out. As frequently happens in contracts on public works the contractors' profits are not commensurate with the labor and risk involved. That it took "a long pull, and strong pull and a pull altogether" in getting this contract under way may be evidenced in the matter of surety bond ordinarily required on state road construction. Due to the hazardous nature of the Wendover job and the unusual features connected with its construction the bonding costs were excessive. At a conference of state and bureau officials it was decided to eliminate the surety bond on this contract and substitute a retent of 20% of the value of the periodic estimates instead of the usual 10%.

Construction Features

For twelve years successive state administrations have made attempts to bridge the Wendover flats and some grading and gravel surfacing has been extended into the flat both from the east and west limits. It had been demonstrated that a drag-line and bucket could handle the mud. No attempt had ever been made, however, to build on the salt beds but that problem has now been solved by the engineers and successfully

accomplished by the contractors. The Western Pacific hauled its embankment material to the salt field, a method far too expensive for highway construction. The plan adopted, suggested by the dyking operations of the salt and potash works at Salduro, was to cut through the salt and build the embankment from the underlying clay. A contract for the construction of the subgrade across the six miles of salt section was awarded in

September, 1923, to N. E. Lamus, superintendent of equipment at Salduro. "Salt is salt," of course, but it is also a safe foundation for a highway if properly protected from the melting action of fresh water. The location of the road, north of the railroad tracks, afforded sufficient protection from the waves and the scouring action of fresh water from a southerly direction. Protection was (Continued on Page 8)



Immediately after opening the Wendover road. Governor Dern of Utah (left) is saying to Governor Scrugham of Nevada, "It's a long job that has no ending."

The other official is W. M. Jardine, secretary of agriculture.



The state and federal engineers connected with the Wendover construction. Beginning at the left: Lee Wendleboe, resident engineer; Howard C. Means, chief engineer of the state road commission; B. J. Finch and B. W. Matteson, respectively district engineer and senior highway engineer, bureau of public roads.

Wendover Road An Example of Cooperative Endeavor

Address at Salduro, June 13, of W. M. Jardine, Secretary of United States Department of Agriculture.

"The completion of the Wendover cutoff is the occasion for much satisfaction. Not only is this project a remarkable and unique engineering achievement, but it is also an outstanding example of the value of cooperative endeavor in public service

"In reviewing the contributions of the various cooperating agencies, it is fitting to mention first of all the splendid spirit and remarkable unselfishness of the state of Utah. This project is not pri-marily of benefit to the state. It is essentially a link in a transcontinental highway of the first importance, and its special purpose is the serving of interstate traffic. Its completion, there-fore, in advance of many other roads needed by the state, is sufficient evidence of the unselfish attitude of Utah. It is true that a certain amount of traffic destined for the Pacific coast might proceed otherwise than by way of the Wendover cutoff, but a logical lane for hightraffic is directly westward from Salt Lake City across the desert to Nevada and California. Utah has not attempted to divert this traffic stream nor selfishly to delay its flow by insisting upon a prior construction of other routes, more urgently needed from the local point of view, such as the route running southwestward through the fertile portion of the state.

"It required courage to undertake this project, not only because of its unusual character and the difficulties of construction, but also because of the very large part of the state's available funds needed for its construction. In view of these facts, the state road commission of Utah is to be congratulated on its consistent and long sustained effort to accomplish the necessary construction, the completion of which is the occasion

for this meeting.

Unique in Road Building "From the standpoint of engineering, these forty-one miles of highway are indeed unique in the history of all road building. Now that the project has been brought to a successful conclusion, it does not appear to have been especially This is a common characteristic of many great achievements. build a road on a bed of salt soluble in fresh water, which drains through this area, seemed hazardous in the extreme at the beginning. But the engineers early discovered that the salt bed was insoluble in the residuent solution in which it lies after the spring evaporation. Consequently, a part of the road is built upon a solid layer of salt, and the layer is permanently protected from disintegration by a clay cutoff wall. In the construction work, horses could be employed only with the greatest difficulty; all fresh water had to be hauled for many miles, and for several miles, the roadbed was completely submerged in brine for months at a time. The contractors who performed the actual labor and furnished the materials have battled

"It is here in the west that need for federal assistance for roads is most strongly felt and expressed. Within a few years the entire west will have been made available to the eastern tourists and the same roads will be accommodating as never before the intrastate and interstate business traffic of the immediate region. Nowhere is more to be gained by highway improvement than in these western states, and there is evidence of their appreciation of this fact in the heavy per capita expenditures which they annually apply to the highways, for such expenditures are not equaled in any other section of the country."

manfully with these trying conditions for the past sixteen months.

"So, not only is the state of Utah to be congratulated for its administrative unselfishness and for its engineering skill, but we must pause here to give praise to the stout-hearted contractors and their assistants, who have contended here through the hot, arid summer and the biting cold of the winter winds, to bring this remarkable piece of construction to a successful conclusion. have met and overcome difficulties that were most unusual. They have shown resourcefulness that is perhaps without precedent in highway construction. It has been necessary to employ a variety of machinery that includes special equipment nowhere else so used. The harmonious cooperation of the engineers and manager of the Salduro salt plant is especially worthy of commendation by all. Their long period of experimentation and design was drown upon for this occasion, and proved to be of inestimable value in solving the special problems presented. And so, when we praise State Highway Engineer Means, we must also include the names of Lamas Zimmer and Bundy, and we must not omit to praise the sacrifice of Resident Engineer Lee Wendleboe, who has been here in the desert on this project from beginning to end and successfully met each difficulty

Splendid Cooperation

"Yet this project would have been impossible if the resources of Utah only had been available for its prosecution. Of the \$380,000 required for its completion the United States government has furnished as federal aid approximately \$284,000. This very substantial contribution has been possible because the road is part of the federal aid highway system, in which, in the United States as a whole there are about 175,000 miles, and in Utah alone, 1588 miles. And so there has been from the beginning not only the most splendid cooperation between the state highway department and

the public and between the engineers and the contractor, but also the cooperation of the federal government. Sitting with the state engineer, engineers of the federal government have studied this design, approved each step as developed, inspected this work as it went forward, and in every possible way encouraged its completion.

"This principle of federal aid for highway construction is now in its tenth year. Already 623 miles of federal aid highways are built or under construction in this state. Federal aid does several things for highway construction. It provides considerable sums of money for needed construction and thus furnishes means for building gaps in highways that would otherwise not be filled. It insures a certain concentration of funds on a selected system of roads which is reasonably adequate to serve perhaps as much as 80 per cent of all highway traffic; and it also insures standardization on a high plane and uniformity of construction. Congress has authorized up to July, 1928, a total expenditure of \$690,000,000 for highways on the federal aid system. A very considerable amount, you will say, yet the government collections in the form of excise taxes on manufactured motor vehicles and parts represents an even greater sum.

"It is now possible to see by the evidence of the progress in the western states that the construction of the federal aid highway system is going to be successfully accomplished within a reasonable time. The road westward from Salt Lake to San Francisco is now about to be completed. It may be another year, possibly longer, before every mile is satisfactorily surfaced with gravel or paved, but it is evident to one who travels across the country that this job will shortly be done. Federal road projects are now being financed in Utah to the extent of 79 per cent from federal allotments; in the adjoining state of Nevada, to the extent of 88 per cent; and in California, to the extent of 60 per cent.

"It is here in the west that need for federal assistance for roads is most strongly felt and expressed. Within a few years the entire west will have been made available to the eastern tourists and the same roads will be accommodating as never before the intrastate and interstate business traffic of the immediate region. Nowhere is more to be gained by highway improvement than in these western states, and there is evidence of their appreciation of this fact in the heavy per capita expenditures which they annually apply to the highways, for such expenditures are not equaled in any other section of the country.

try.

"It is impossible adequately to predict the ultimate significance or the effects of the completion of the Wendover cutoff. We know that for the first time it pro-

vides a direct route west to San Francisco. We know that San Francisco has been one of the important objectives of the Pacific coast for westward travelers for half a century and that it is now the objective of increasing numbers of eastern tourists who are going to the Pacific coast. These tourists know that the Pacific coast highways are paved and, accordingly, that to reach San Francisco is to reach any portion of the coast by a paved highway.

Significance of Work

"It is impossible to omit from our thinking on this occasion the hardships and significance of the early travel westward. We are making possible nighway travel in terms of hours that seventyfive and even fifty years ago required days and months. In the construction of railroads America has excelled, and we now realize the significance of the completion of the east and west trunk railroads. We see what has happened as a result of rail traffic from coast to coast. In this same state a problem of railroad construction analogous to that of the Wendover cutoff was met and solved by the Southern Pacific railroad by the construction of the famous Lucin cutouf across the Great Salt lake in 1903. This Wendover cutoff crosses a part of the bed of that same great ancient Lake Bonneville, and the travel that will occur here is symbolical of the new traffic on highways in the period in which we now find ourselves.

"We are recognizing the need for a complete grasp and a systematic working out of the highway traffic problem. My predecessor in the department of agriculture, Secretary Gore, accordingly appointed a joint board, consisting of representatives of several state highway dcpartments throughout the country and engineers of the bureau of public roads, to work together on the numbering and signing of main interstate routes throughout the states. This board is now at work, and, after an initial meeting in Washington in April, it held its first regional meeting in San Francisco last month. It will continue to hold a series of meetings throughout the country, and the whole board will then reconvene for a final consideration of the results of the regional conferences. It is expected from the work of these men to be able more intelligently to guide public highway traffic, in protecting motorists from accidents and delay, and the work of the board will lay the foundation for the early improvement of the missing links in important interstate routes.

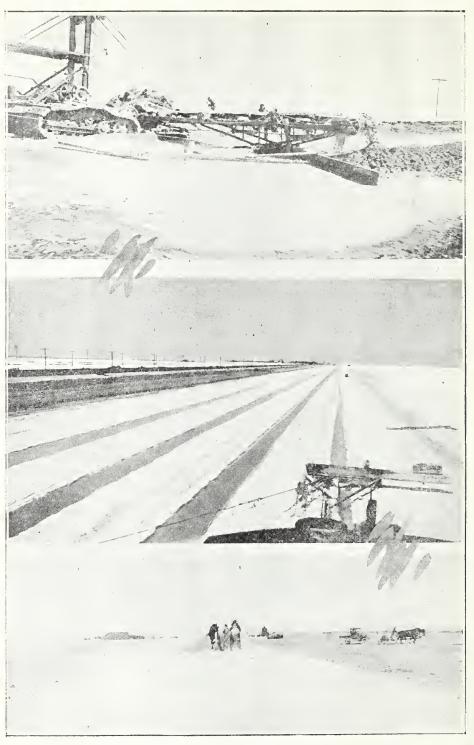
"It is doubtful if the public at large appreciates the magnitude of the large problem of highway construction and operation. We are confronted much more frequently with statements as to expenditures for highways than we are with statements as to the cost of vehicular operation over the highways. Occasionally one hears the complaint that the billion dollars, about one-tenth from federal. three-tenths from state and sixtenths from local sources, annually expended for highway construction and maintenance in the United States is excessive. How many of those who give voice to this complaint, I wonder, realize that the American people pay each year

more than eight billion dollars for the purchase, upkeep and operation of motor vehicles? Or that the annual sales of new motor cars and trucks amount to more than double the billion-dollar expenditure for roads? Or that, if all the new cars and trucks sold each year were parked in a single line on the new roads built in the same year, the intervals between them would be less than fifty feet each? Yet these are the simple facts. The entire cost of highway construction and upkeep is only about 10 per cent of the whole bill for highway transportation. We cannot escape that 10 per cent; for, if we do not improve and main-

tain the highways, the addition to the operating bill, already 90 per cent of the total, will more than offset whatever we deny the roads. In the end, if such a policy were persisted in, our fifteen-billion-dollar investment in highway rolling stock would become practically useless because of highway deterioration.

Minimum Outlay

"There is one other mistaken belief with regard to highway improvement to which I should like to direct your attention at this time. Some people seem to think that what they choose to call



Constructing the Wendover road. Top, trencher with conveyor attached, excavating clay for the road from beneath salt layer. Center, the parallel trenches cut through the salt in obtaining embankment material. Below, wheel scrapers moving windrow gravel from railroad to roadway.

the excessive taxes for road improvement are due to the building of the main roads by the state highway departments; and the state highway departments and the federal government are sometimes accused of wasteful expenditures on these main roads. From some quarters there has come the demand that we return to the old policy of county control of all roadwork as a means of reducing the cost. Well, the fact is, as I have previously said, that the federal road expenditure is less than one-tenth of the total, and the whole expenditure by the state highway departments and the federal government together is less than half the annual billion-dollar expenditure. Yet these roads, built by the state departments and the federal government, because they are by far the most important roads, carry much more than half the traffic. Could we improve matters by vesting control over these roads in the county governing authorities? Suppose we overlook for the moment the recognized fact that no semblance of uniformity in highway improvement could ever be obtained under county control, and consider only the ability of the counties to finance the improvement, and the simple fairness of such a method if they could. Take this Wendover cutoff as an example. Do you think that Tooele county ever could have built this Or, assuming that it could raise the necessary fund by burdensome taxation of its sparse population, do you think we could fairly have expected it to do so, when so vast a proportion of

the traffic that will flow over it will have originated outside the county and even outside the state of Utah?

Where Traffic Originates

"When we consider the example of this particular interstate road the proposal that the counties shall take over the burden of building and maintaining such roads is reduced to absurdity. Yet the same element of unfairness is present in lesser degree in the proposal when applied to almost any county in the United States. In these days, my friends, travel on the main highways is not limited to the borders of any county or of any state. In some states there are important roads on which, by actual observation, it is known that more than half of the traffic originates in other states.

"I think I am safe in saying that there are many counties traversed by main road, on which not 10 per cent of the traffic originates within the county. The main roads are essentially intercity roads. A very large proportion of the traffic they carry is bound from city to city. Yet these roads pass through counties in which there are no cities. If the residents of such counties are to be called upon to pay for the improvement of these roads we cannot, in justice, expect them to pay for a type of improvement that is more expensive than their own local traffic would justify. And yet, as such a type of improvement would be wholly inadequate to carry the traffic, the county would be faced with the triple alternative of financing the greater cost of a type of road which is beyond the local needs, of paying excessively for the

maintenance of an inadequate road, or of seeing the road it has paid its money for quickly destroyed by the traffic.

Taxation Question

"I am convinced, my friends, that if there is excessive taxation for highway improvement anywhere in this country it is due more to the unwise attempt to finance high-type main roads with county revenues than to any other cause. I believe that highway taxation would be less burdensome if more of the money needed for road construction and maintenance were raised by state rather than by county taxation and expended under the supervision of state rather than county authorities.

"And so, while we are to be congratulated on the completion of the Wendover cutoff as a link in the great highway system which we require, and while it is a splendid engineering achievecment, I feel that the completion of this road is, first of all, a lesson in the value and wisdom of cooperative endeavor in the construction of the principal roads. To-ward the building of this road each interested governmental unit—county, state and United States—has given of its resources in proportion to the benefits it will receive, and an improvement which it would have been impossible or inadvisable for anyone to undertake alone has been successfully achcieved by a splendid cooperation. We may well reach, as the best result of this effort, increased resolution to go forward until we shall have reached the goal toward which our efforts are directed—the completion of a well-balanced and thoroughly articulated system of highways."



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H. V. RICHARDS, Editor

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THIS MONTH'S COVER PICTURE

Although this issue of the Utah State road magazine is chiefly devoted to the Wendover road and the commemoration of its completion at Salduro on June 13, we are pleased to show as a cover insert this month a road in the scenic regions of southern Utah. It is one of the numerous scenes to be found in Red Canyon, from which it is difficult to select the most striking and pleasing picture. The Wendover country is all right in its way but nobody ever said it was scenery. road is a most useful addition to Utah's road system and a feeder for the routes which traverse the more colorful and pleasing landscapes. The Red Canyon road is on the branch which leaves the Grand Canyon highway just south of Panguitch and leads directly to the wonderfully eroded forms and colored sculpturing of the Bryce ampitheater. The road is well named from the soft and pleasing tints of the reddish and orange colored cliffs and spires embroidered with the green of the pines which have strayed down from the Sevier national forest.

CONSIDER THE MOTOR BUS

"Establishing new motor bus lines," says Better Busses, "is America's new favorite outdoor sport." However much these new users of the highways, motorized conveyors of passengers and freight, may have been condemned by highway builders, the motoring public, tax experts, the street railway and interurban lines, the fact remains that wherever you find a new good road there also is the new bus line. As for the highway builders they have learned that the road surface must be built smooth and kept so, regardless of the strength of the paving if it is not to pound to pieces under the heavy Compared with other means of transportation the motorist is finding the motor bus his friend and ally. It conforms to the same traffic regulations, it stops at the curb to receive and discharge passengers, fits into the traffic stream without congesting same, it acts and behaves like his motor car. So far as taxation is concerned while the speed of the development of the new transportation was several laps ahead of the new law, the truck and the bus are now paying their way and cooperating with other users of the highway in the costs of repairs of old roads and the building of new.

As to its legal status as a carrier of interstate commerce this lusty infant industry is still an enigma. The California Supreme Court has ruled that the State Railroad Commission has no authority to impose regulations upon automobile stages engaged in interstate commerce. The United States Supreme Court has ruled, in two decisions on March 2nd, that a state cannot refuse to license motor vehicles engaged in interstate commerce to use its highways. The state's authority to make regulations respecting safety and the conservation of the highways is recognized but the state must not put even an indirect burden on interstate commerce; it cannot refuse to permit motor vehicles to use its highways. The interstate commerce commission has looked over the situation and declared recently that it has no authority over motor common carriers. So, some interesting developments are expected regarding federal control of the lines engaged in interstate business, and, it is quite probable, in the entension of federal responsibility in the construction and upkeep of the highways so used.

The first national convention of the operators of bus lines completed a two-day conference at Chicago on June 18, at which was organized the National Motor Bus Association representing \$296,000,000 worth of capital. The question of affiliating with the American Automobile Association was left to the board of directors. A resolution was adopted asking congress to empower the Interstate Commerce Commission to grant or refuse certificates of convenience and necessity to interstate carriers but limiting the power of that commission only to the granting or refusing of such certificates.

THE COLTON BILL

With transcontinental traffic ever and ever increasing, it has become patent that the construction of primary and interstate highways is lagging behind in these western states that have large areas of non-taxable lands within their borders. The languishing process in fact has reached the point under the Federal Aid plan.

The situation is primarily due to the fact that these public land States are unable to meet Federal Aid appropriations for the good reason that their resources in population and wealth are disproportionate to the task required of them.

This simply means that the national road program is facing an emergency. It is necessary to amend the law so that Federal Aid will conform to conditions in the States in question. This is the purpose of the bill introduced by Congressman Colton of Utah in the first session of the Sixty-eighth Congress. It has two main provisions; first, the granting of 100 per cent Federal aid for primary and interstate highways in public land States where the population does not exceed ten persons to the square mile, and second, the repeal of the per-mile limitation of the amount which may be given in those States.

What is proposed is simply a necessary development of the graduated scale so as to permit the switching of funds to primary highways, without increasing the allotment of any State. The Colton Bill was indorsed by the last two annual meetings of the Association of State Highway officials and has the support of the Bureau of Public Roads. Its enactment is necessary if we are to have the far-flung system of highways contemplated under the Federal Aid plan.

-American Motorist.

GROWING POPULARITY OF THE GAS TAX

Thirty-five of the forty-eight states and the District of Columbia imposed a gasoline tax in 1924. The total collected for the year was \$79,734,490 of which amount \$48,711,326 was made available for road construction and maintenance under the supervision of the various state highway departments. A large share of the remainder was turned over to county and local road funds. In a few states a portion was credited to the school fund and for miscellaneous purposes.

Nine more states have been added to the list by the 1925

Nine more states have been added to the list by the 1925 legislatures; they are: Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, Rhode Island and Wisconsin. Only four states remain to complete the procession, New York, Massachusetts, Illinois and New Jersey. Illinois may have been added to the list but was in doubt at last reports.

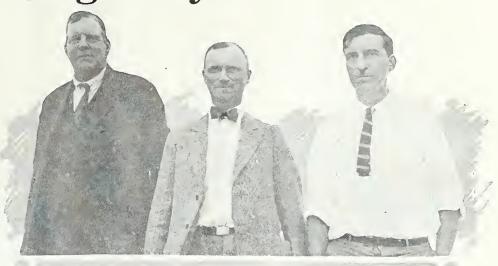
In addition to Utah there were fifteen other states who have recently increased their gas tax rates. Arkansas formerly alone with a four-cent tax has been joined by Nevada and North Carolina. Utah is next and alone with her three and one-half cent rate, sixteen commonwealths levy three cents of which ten have raised from the one or two-cent rate, Wyoming is alone with two and one-half cents, nineteen have a two cent tax and four, Connecticut, North Dakota, Rhode Island and Texas, levy only one cent.

The Contractors of the Wendover Highway

A tribute is paid by Secretary of Agriculture Jardine, in his address at Salduro, published in full elsewhere in this issue, to the engineers and to the contractors who built the Wendover highway. We carry a picture on this page of the three contractors, N. E. Lamus, Oro Bundy and R. G. Zimmer, whose energies and resourcefulness have carried the work to a successful conclusion. These are the men who were on the job when the desert smarted under the rays of the summer sun and who waded in icy salt water of a temperature several degrees below zero during the winter months when the biting winds blew with remorseless intensity. It was their job to shoulder the financial responsibility, to guide, direct and encourage their forces even though the difficulties seemed, at times, well nigh insuperable. It was their task to keep animals and machinery in commission and going under unusual and difficult conditions; to bring order out of chaos when the pon-derous machines appeared about to sink in bottomless mud and when the horses were on their backs in the clay, their legs waving in the air an obeisance to the gods of disaster.

Prior to their successful partnership in the construction of the Wendover road a brief outline of their experience is given as follows:

N. E. Lamus, native of Minnesota, em-



Meet the contractors who built the Wendover road. On the reader's left is N. E. Lamus, then Oro Bundy and R. G. Zimmer.

ployed for several years by a mining company in California and for the past four years master mechanic for the Utah-Salduro company in its salt and potash works at Salduro.

R. G. Zimmer, a native son of Montana, graduate of the Houghton, Michigan, school of mines, several years with mining companies in Montana and Nevada, general superintendent of the Utah-Salduro Company since 1917.

Ora Bundy, from Indiana, graduate of Purdue university, ten years general construction and bridge engineering in the Middle West and Southern States. Major of engineers in a construction division during the World War and superintendent of several large projects, including the Ogden Arsenal. Mr. Bundy had under his immediate supervision the entire Wendover job.

Have you checked up on culvert performance?

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SALT LAKE CITY

Road Across Salt Desert Completed

(Continued from Page 2)

necessary on the north where the waves could lash the embankment from an unobstructed sweep of many miles.

The first operation was to cut a trench through the salt under the north slope of the proposed section. The salt was deposited on the north of the trench and the clay, which was excavated by the trencher to a depth of 12 feet, carried by a conveyor attachment along the line of the embankment. In the completed road this trench "keys" the embankment to the clay underlying the salt, being backfilled, first with salt and then with clay from parallel trenches, the material in the embankment connecting with the clay underneath and effectively preventing the ingress of fresh water. Over several miles both on the salt and the mud flats a 6 to 1 slope, heavily graveled, was constructed on the north to counteract the effect of wave action, on the south a 3 to 1 slope was found sufficient.

After several revisions of the specifications and twice advertising for bids the contract for the remainder of the subgrade and all of the gravel surfacing was awarded to Kroft, Bundy, Zimmer and Lamus—Kroft later withdrawing from the firm. This contract was awarded Dec. 24, 1923, from which time the work progressed over the entire project until its recent conclusion.

It is of interest that the total value of the equipment was in excess of \$110,000. Most of it, particularly the tractors and trenchers, was rented from the Utah-Salduro Company.

Many types of machines were found to be necessary in building the project. Owing to the difference in the consistency of the sub-strata of the mud formation a machine that would work success-bully on one section would be a total failure on another portion a quarter of a mile away and identical in surface appearance.

Due to the fineness and slow-drying qualities of the mud the wind was found to be a much better drying agent than the sun and road graders attached to tractors were moved back and forth for the purpose of aerating the mass. Account was kept of the mileage traveled on one two-mile section and it was found that in working down and drying this stretch a small tractor traveled 210 miles and a larger one 156 miles.

Gravel for the project was placed in windrows along the tracks and conveyed either by trucks or by horses and wheel scrapers to the roadway. Culverts, to permit the passage of the wind-driven waters under the roadway, were constructed entirely of wood as the salt and other chemicals quickly attack any form of metal. Treated timber fastened with hardwood pins was used throughout the project.

History of the Route

Many of the earliest explorers and pathfinders followed the Wendover route, finding it the shortest and also the one with the easiest grades from the Salt Lake Valley to the Pacific Coast. Among those who followed this route were John

C. Freemont, Kit Carson and Jim Bridger. During the California gold rush of '49 the treacherous nature of the mud flats caused the abandonment of the route for the less direct and more tortuous trails to the north around the lake or to the south around the southern extremity of the desert. The earliest official explorations of the region state that tons of equipment, including tools, clothing, food and supplies of all kinds, lay dumped upon the flat where teamsters had been forced to lighten loads, while here and there sunken wagons and the bleached bones of oxen showed where the owners had abandoned everything in a flight for their lives from this scene of desolation.

The building of the Western Pacific in 1909 led to the consideration of the route for a modern highway and about the time that through routes for automobile traffic became a pressing problem, Tetzloff, a famous automobile racer, drove through Utah and in investigating routes west from Salt Lake City drove at the rate of 105 miles an hour on the salt beds without treating a tire and declared that except for the rather too ardent desert sun he had found the most ideal race course that lay out of doors. Further investigation of the route followed and a few sentences from the bi-ennial report of the Utah State Road Commission for the period 1913-14, give the chief reasons that have later led two Democratic and two Republican state administrations, the Bureau of Public Roads and the United States Army, to approve the Wendover Cutoff. "During the biennium the Commission has given consideration to the question of an interstate road extending in a westerly direction from Salt Lake City through Tooele County into Nevada. A number of routes for this road have been investigated, but the one most favored roughly parallels the Western Pacific railroad from Timpie to Wendover.

"In addition to this being the shortest course from Salt Lake City to the Nevada line or even to Ibapah, of those given serious consideration, the fact that it is close to a railroad argues for its low cost of construction, and for the safety of the traffic which it will accommodate after it is constructed. On the other proposed routes, grades of considerable consequence are encountered but on the Wendover route the grade is practically level, and the alignment straight for the greater part of the distance."

The practicability of the route is thus emphasized for the reason that an unfortunate controversy has existed between the State of Utah on one hand and a trail organization on the other as to the choice of routes, a dispute that has had nation-wide publicity and which was carried before Secretary of Agriculture Wallace for final adjudication as to the location of the primary federal route. In addition to its other unusual features the Wendover road, out of the 170,000 miles of highway in the federal system, is the only one on which the Secretary of Agriculture held a hearing before making his decision.

Following the investigation of routes by the Utah Commission in 1913-14 the Wendover route was made a state road in 1915, and considerable pioneer construction was undertaken in 1915 and 1916, financed largely by private contributions.

Some salvage of old embankment and gravel was effected under the recently completed contract. Ample stock piles of gravel have been left by the contractors at regular intervals along the road for maintenance purposes and the Road Commission has already arranged for effective patrol of the entire project to protect the heavy investment of public funds and keep the surface in first-class travelable condition. Experiments to date show that brine from the adjoining trenches is effective in packing the gravel and preventing the loss of binder.

Price-Cisco Road Is Now Being Surveyed

The road commission has ordered the location of 125 miles of road on State Trunk Line No. 8 from the end of the pavement at Price via Soldier Creek Junction, Green River and Thompson to Cisco. M. C. Moffet is now in the field with a location party and the work is well under way. The counties of Carbon, Emery and Grand are cooperating in the expense of the survey which is preliminary to the construction, with gravel surfacing of Federal Aid Projects 74, 75, 100 and 101. The reconnaissance survey was made the latter part of May by B. W. Matteson, senior highway engineer of the federal bureau of public roads; H. S. Kerr, assistant chief engineer of the state road commission, and Mr. Moffet, the locating engineer.

Grade Crossings Eliminated

The reconnaissance has shown that it will be possible to eliminate all the grade crossings of the main line of the Denver & Rio Grande Western railroad. There are ten such crossings at present, four between Price and Green River and six between Green River and Cisco. only grade crossing that will remain is over the branch railroad from Soldier Creek Junction to Sunnyside. The Cat Canyon route from Price has been selected as more suitable for permanent location than that via Mounds. Some saving in distance will be effected in Carbon county and a considerable shortening of the road will be made in Grand county where the new line will follow the railroad between Little Grand and Thompson instead of via Valley City as at present. Altogether the new line will be eight miles shorter than the present route.

UNFORTUNATE OCCURRENCES

Queer casualties are sometimes charged against the motor world. An unconfirmed report states that an African lion recently swallowed a flivver and forgetting to shut the engine off, shook to death shortly after. The Henhouse Bulletin has just reported that Mrs. Hen crossed the road because despondent over continued ill health.—Carolina Motorist.

Status of Federal Aid Projects

By F. S. THOMPSON, Chief Draftsman

Projects Under Construction or Contract May 31, 1925

Projects Under Construction or Contract May 31, 1925									
No.	County	Na	ıme	Type	Lgth.	Per Ct Comp.			Estimated Cost
7-A San Juan La Sal Junction-Big Value Chicken Creek, Millard Chicken Creek, Millard Chicken Creek, Millard Chicken Creek, Millard Knolls-Wendover Knolls-Timpie Knolls-Timpie Knolls-Timpie Ash Creek-Iron Co. Ash Creek Bridge Layton-Clearfield Echo-Emory Chase-Bear River Cit Bear River Bridge Bear River Bridge Bear River Bridge Malad River Bridge Wasatch-Bridal Veil Parowan-Winn Hollow Scipio-Holden		ek, Millard Colover ie ron Co. Bridge rfield River City Bridge r Bridge dal Veil Fal	h Gravel 5.06 55 Butler & O'Berto Cravel 13.87 99 Hawley, Anderson & Hinkley Gravel 41.90 98 Kroft, Bundy, Zimmer & Lamu Gravel 35.33 2 Wheelwright Construction Co. Gravel 8.65 84 Paxton, Dorrity & Black Con.Arch 210 ft 30 Whitney & Reynolds Resurf. 4.11 88 Ryberg Bros. Gravel 11.0 46 Wasatch Grading Co. Gravel 5.09 100 Olaf Nelson Concrete 267 ft. 5 C. F. Dinsmore & Co. Concrete 100 ft. 99 Jas. J. Burke & Co. Gravel 3.37 43 Inland Engr. & Const. Co. Gravel 9.57 0 Reynolds-Ely Construction Co. Gravel 12.04 41 Hawley, Anderson & Hinckley			er & Lamus uction Co. lack s Co. st. Co. uction Co.	\$ 52,948.20 93,686.67 379,396.49 249,597.72 140,727.42 28,953.66 141,000.68 153,288.73 80,385.19 54,226.29 17,763.08 52,862.19 95,342.26 85,823.99 49,419.87		
72 77-A	Sanpetè Sevier	Fairview-Mt Richfield-Els	. Pleasant	Gravel Gravel	4.98	84	Gray & Murdock		55,782.12
81-A-1 81-A-2 82-A 98-A 98-B	Washington Washington Beaver Beaver Millard	Anderson's-T Toquerville I Manderfield Wild Cat-Mi Beaver Co(Coquerville Bridge Hill llard Co.	Gravel Concrete Gravel Gravel	$\begin{array}{c} 0.5 \\ 5.8 \end{array}$	$100 \\ 70 \\ 100 \\ 35$	A. G. Young & Co. Raleigh & Higbee C. A. Kemp Inland Engineering Inland Engineering	Co.	57,506.28 34,886.04 15,363.10 8,852.60 40,456.08
		Deaver Co(ove Fort	Gravel ,	2.1	50	Inland Engineering (Co.	21,151.10
	Dump Improvemention was recent			Projec	cts for	Which	Plans Have Been Ap	proved	
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proval w his much	ill be granted in h needed im pr over	time to make ment this sea-		Proje	cts for	Which	Plans Have Been Sul	mitted	
ong been from Can estimated	s particular streton a menace to to monville and Hen do that this impo	traffic to and crieville. It is rovement will	63-B 94-A	Box Elder Duchesne			ver City-Tremonton ntelope	Gravel Gravel	9.0 Mi. 9.2 Mi.
which wi	ut \$40,000; thirty ill be furnished	from Forest			Plans i	in the	Course of Preparation	n	
Ri Bide w the pavi	the project is apply everdale Viaduct were opened Maying with Bitumir dale Viaduct apply	Paving 19th last for nous Concrete	65-B 73-A 78 94-B 94-C	Utah Utah Iron Duchesne Duchesne	Sr Ce Ar	oanish eda r C ntelope	eil Falls-Orem Fork-Detour ity -Duchesne oosevelt	Gravel Gravel Paving Gravel Gravel	6.3 Mi. 30.0 Mi. 1.13 Mi. 10.3 Mi. 9.5 Mi.
miles in oridges o	n length. The over the Union Pε	grading and acific Railroad				Surve	eys Completed		
and the fill has be winter in paction f Some d County in due to th this road The traff	er River was comp gravel surfaced poeen allowed to so order to secure so for the 20-foot po- lifficulty was expen- in maintaining the ne extremely heaved both in summe fic count of May 2300 vehicles per	portion of the ettle over the sufficient com- avement. erienced by the gravel surface cy traffic over r and winter. 6th showed a	62-B 62-C 62-D 64-A 68-B	Piute Summit Morgan Weber Davis Weber Piute Millard Washington	E1 M M D0 D1 M3	mery-Wountain organ- evil's Cavis Co avis Co arysval	ge-Garfield County Vasatch n Green-Weber Co. Devil's Gate Gate-Weber Co. Line-Wash. Ave. le-Sevier ley-Kanosh Zion Park	Gravel Gravel Gravel Gravel Gravel Gravel Gravel Gravel	3.5 Mi 14.01 Mi. 1.6 Mi. .4 Mi. 1.9 Mi. 5.5 Mi. 4.9 Mi. 14.0 Mi. 9.0 Mi.
which we	ere trucks.					Propos	sed New Work		
to Gibbon Lake wh whose bi the engin the near ditions an son has	ns and Read composed were the only id was under the neers. Work will future as soon as re favorable. The been unusually continued Engineer S. L. (npany of Salt bidders and e estimate of commence in s weather con- e present sea- old and rainy.	73-B 74-A 75-A 86 87 95 100-A	Utah Emery Emery Tooele Tooele Carbon Grand	Ca W Sa M So	arbon (oodside alt Lak ills-Too oldier S	oldier Summit CoWoodside e-Green River e CoTimpie cele Summit-Castle Gate iver-Floy	Timber Brid Gravel Gravel Gravel	8.0 Mi. lge 265 Ft. lge 250 Ft. 28.0 Mi. 8.6 Mi. 21.0 Mi. lges 420 Ft.

charge of this improvement for the State.

Ogden a Scenic and Industrial Center

The winding ribbon, prominently situated in the upper of the two views, is the paved state highway running east from Ogden. The picture is taken from the high, rocky entrance to Ogden canyon a view of which, at the "Narrows," is shown below. The horizon line in the upper view shows Fremont island, on the left, in Great Salt Lake, and Promontory Point, the tip of a peninsula which extends for twenty-five miles south into the lake. It was immediately north of the peninsula that the first rail communication across the continent was effected, in 1869, and Promontory Point is a station on the cut-off which the

Southern Pacific has in recent years built directly across the lake. The delta-like formations, around which the highway winds in reaching the canyon, has been formed in past ages by the Weber and Ogden rivers, of detrius which renders exceedingly fertile the farming region around Ogden.

For four miles the canyon is very narrow, there being barely room for the highway, on one side of the river, and the trolley tracks on the other—a thin notch cut through a mass of quartite ledges which stand nearly on edge. At various points in the canyon are attractive summer resorts and summer homes.

About eight miles from Ogden the canyon broadens into a beautiful mountain valley where some years ago the city secured an option on a large tract of land, favorably situated, and succeeded in developing 34 large artesian wells which supply over 2,000,000 gallons of water every 24 hours. The purity of the water is unexcelled and does not vary in quality or quantity in dry years or wet. The water is piped to cement reservoirs near the east city limits.

Ogden is headquarters for, and has in or near it, factories and plants connected with the canning industry, with beet sugar, flour and Portland cement. The output of flour is such that Ogden is becoming the "Minneapolis of the West." The population is 45,000.

Government activities centered at Ogden are the district offices of the forest service, the bureau of public roads, and

Ogden arsenal.



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Motor Bus Law In Operation

The administration of the enactment of last winter's legislature placing a mileage tax on the automobile passenger and freight lines is under the direction of the Public Utilities Commission. Comprehensive forms for making passenger and freight trip reports, daily and monthly summary reports have been prepared by the Commission and are being submitted by the seventy carrier lines in the State. Receipts from the tax which are credited to the State Road Fund, will be, it is now estimated, approxmiately \$25,000 yearly. Forms for making the reports are furnished the carriers at cost. The terms of the law are such that the making of reports on the part of the carriers is a somewhat complicated procedure and the checking thereof by the Utilities Commission requires a good deal of clerical labor. The law states that for freight a tax of twothirds of one cent per ton mile shall be paid when hauled over a hard surface road (concrete or bituminous pavement), on all other roads one-fourth of one cent per ton mile. For passenger service the rates are one-fourth of one cent per passenger mile on hard surface and onetenth of a cent on other roads. Therefore it is essential that a record be made and the Public Utilities Commission have on file every pound of freight or express carried in the state by bus lines, its origin and destination, as a check on the mileage and type of mileage. Passenger reports cover the total number of passengers carried, the one-way and round-trip passengers, the free passengers, the mileage and types of mileage. One shudders to think of the volume of the contumely which should be heaped upon any passenger so remiss as to carry on his person, on one of these trips a bottle of contraband goods. In the first place he is not only cheating the carrier out of an express fare but the road is being used without a proper return to the State. He is also guilty of transporting liquor by automobile, he is breaking municipal regulations at both ends of the line, he is violating the State prohibition law and the federal statutes, he looks ascance at the constitution and is, in short, a moral direlict, and very many times a criminal.

Illegal Carriers

While on the subject of illegality it should be noted that while the seventy carriers, operating under a license of convenience and necessity, are complying with the law making proper return on their operating revenues and expenses and paying the tax there are carriers operating regularly or occasionally—non-licensed—using the roads without just return and in competition with carriers who are paying the state tax. Ignorance of the law is no excuse but in every instance where non-licensed carriers are found to be operating they are furnished by the public utilities commission with a copy of the law, the forms required in making return and given an opportunity to conform to legal requirements. Every effort will be made to check illegal operators, not only in

the cause of revenue but to protect the regular bus lines and assist them in meeting the obligation which the law requires. The driver of a mail route who carries passengers regularly or occasionally become thereby a common carrier and the state is entitled to the passenger mile tax. On one bus line operating out of Salt Lake City the carrier is paying an average of \$400 per month for the mileage tax alone in addition to other local, state and federal taxes. Obviously every effort should be made and is being made to check the activities of illegal carriers on roads where regular bus lines

ROAD TO NATURAL BRIDGES

On the Blanding-Natural Bridges highway, San Juan county, the section between Blanding and the Elk mountains has been opened to automobile traffic, the stretch between Allan county and Kigalia having been recently completed. The work has been done by LaSal National forest forces under the direction of Supervisor O. A. Olsen.

The Indian agency, San Juan county, and citizens of Blanding have contributed \$3,000 for further extension of the road to the immediate vicinity of the bridges.

Good Roads Open the Door

A bad road is a door closed in the face of opportunity.

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Federal Aid Road Job One Third Through

Uncle Sam is helping build roads so fast that when he turned the corner into 1925 he had placed under construction nearly one-third of the total mileage of the main, interstate and intercounty system provided for in the Federal Highway Act approved in November, 1921. In brief, according to the report of the bureau of public roads, he had placed 54,-954 miles of federal aid roads under construction up to January 1 last, which will cost him \$452,880,341, while his contract with his peoples calls for 174,350 miles. In addition a very large mileage, probably in excess of the mileage proposed for improvement with federal aid, already has been improved by the states without federal assistance.

The total of all federal aid funds apportioned to the states up to the beginning of the year was \$525,125,000, of which \$469,498,477 had been definitely allotted to particular projects totaling 57,073 miles. The 54,954 miles which had been placed under construction will re-

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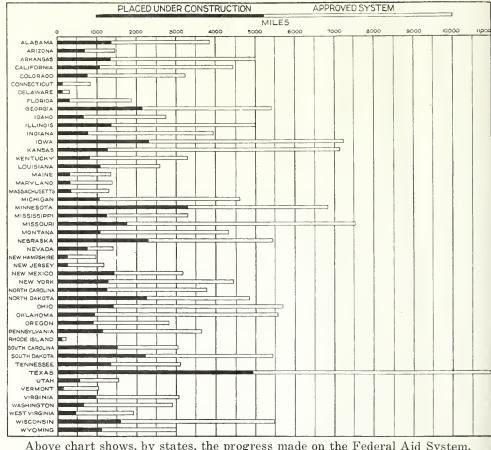
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Above chart shows, by states, the progress made on the Federal Aid System.

ceive Federal aid in the amount of \$452,-880,341, and of this sum \$380,528,813 had been paid up to January 1 for work completed on these projects.

Of the mileage which had been placed

under construction up to the beginning of the current year a total of 42,828 miles had been completed, leaving a balance of 12,127 miles actually under construction at the beginning of the year. Work will be continued on this mileage during the year and it is anticipated that fully ten thousand miles will be completed before January 1, 1926.

The accompanying chart mileage of the approved Federal-aid system in each state and the portion which had been placed under construction with Federal aid up to the beginning of the year.

The state with the largest approved mileage is Texas in which the system includes 10,930 miles, nearly five thousand miles of which already has been placed under construction with Federal aid.

The chart shows Utah's 1567 miles of approved highways, and about one-third completed or under construction with Federal aid. Utah's allowable mileage is 1684, the balance being withheld pending the approval of a route from Duchense westerly out of the Uintah basin and another from Tremonton to the Idaho line. Since the inception of Federal aid to June of this year there have been completed 548 miles with Federal assistance and 114 miles are now under contract. Of this total of 662 under contract. Of this total of 662 miles 166 were built or approved for construction prior to the enactment of the law establishing a correlated system of Federal highways and on roads which do not form a part of the system we are now engaged in building. Roads on the approved system paved by the state without Federal assistance total 146 miles and 25 miles form a part of the forest highways bringing the total Federal mileage now being improved to a high standard to 667 miles.—American Motorist.

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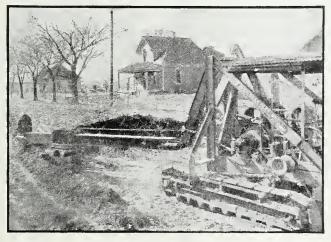
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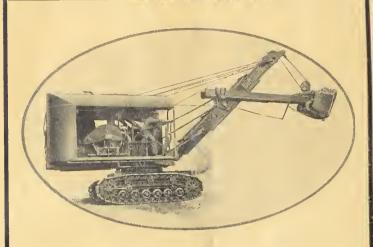
Speed—with whatever attachment you please, a whirlwind for action. Three to four round trips per minute, with a clam shell bucket, loading and dumping is an average operator's work.

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The outstanding superiority of the P & H wherever comparisons are made is well known. Being pioneers in the development of the successful gasoline excavator, has given us experience that can be gained in no other way. The quality of design and workmanship and the selection of materials used are given still greater attention today; all contributing to longer life, lower maintenance, and greater production.

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We pack the paved highways coming in and out of town. We over-run even socalled remote regions. And we are pounding to pieces all but permanent roads.

This year probably 4,000,000 new cars will be on the road. Compared to this increase, the mileage of new permanent roads will be insignificant.

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The answer is, build more, and where necessary, wider concrete roads—and start building them now.

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Your highway authorities are ready to carry on their share of this great public work. But they must have your support.

Tell them you are ready to invest in more Concrete Highways, now.

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